SYSTEM OVERVIEW

Description: The NETSURE™ 211NGFB DC Power System is a complete integrated power system containing rectifiers, intelligent control, metering, monitoring, and distribution. This power system consists of the following mounted in a 1RU or 2RU high by 19" or 23" wide shelf.

- **500W or 1000W Rectifier Modules**

  The 1RU high by 19" wide shelf accommodates two (2) 500W or 1000W Rectifier Modules.

  The 1RU high by 23" wide shelf accommodates three (3) 500W or 1000W Rectifier Modules.

  The 2RU high by 19" wide shelf accommodates four (4) 500W or 1000W Rectifier Modules.

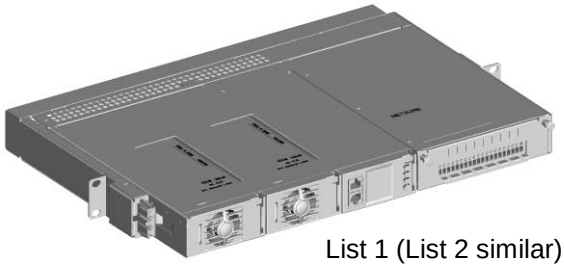
  The 2RU high by 23" wide shelf accommodates six (6) 500W or 1000W Rectifier Modules.

  The Rectifier Modules provide load power, battery float current, and battery recharge current during normal operating conditions. The Rectifier Modules are designed to provide constant power. They are designed with the latest patented switch-mode technology using DSP (Digital Signal Processing) functionality for efficient operation. This means that, within the normal operating ambient temperature range and input voltage range, the maximum available output power is a constant 500W or 1000W. Within these ranges, the Rectifier Modules operate in one of three modes, depending upon load demands. Transition between modes is completely automatic. If ambient temperature rises above or input voltage falls below acceptable values, Rectifier Modules continue to operate but at derated output power levels.

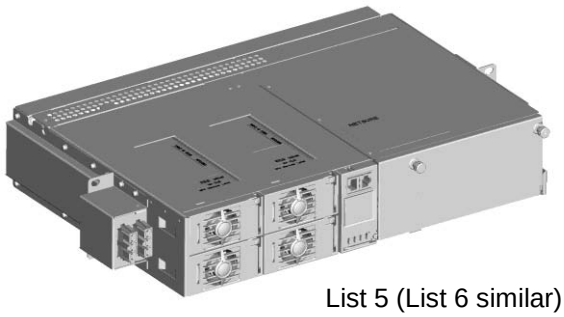
  1) **Constant Voltage Mode:** For any initial output voltage setting from 42 to 58 volts, output voltage remains constant regardless of load. This is the normal operating condition, in which loads are being supplied and batteries are float charged. Rectifier Modules operate in the Constant Voltage Mode unless load increases to the point where the product of load current and output voltage is approximately 500W or 1000W.

  2) **Constant Power Mode:** As load increases above approximately 500W or 1000W (non-adjustable), output current continues to increase, but output voltage decreases as required to maintain constant output power. Rectifier Modules operate in the Constant Power Mode unless load continues to increase to the point where the current limit setting is reached.

  3) **Constant Current Mode:** If load increases above the current limit setting, output voltage decreases linearly to maintain output current at current limit.



List 1 (List 2 similar)



List 5 (List 6 similar)

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- **ACU+ (Advanced Control Unit Plus)**

  The ACU+ provides Rectifier Module and optional Low Voltage Battery Disconnect (LVBD) or Low Voltage Load Disconnect (LVLD) control, metering functions, monitoring functions, and local/remote alarms as well as PCU control, data acquisition, system alarm management, and advanced battery and energy management. The ACU+ contains an LCD display and keypad for local access. It provides connection for binary inputs, programmable relay outputs, and a charge control function. The controller also supports rectifier temperature compensation if the system is equipped with a temperature probe (or multiple temperature probes connected via a Temperature Concentrator (SM TEMP), and ambient air temperature monitoring if equipped with a second temperature probe. The ACU+ provides Ethernet connection and supports software upgrade via its USB port. It also comes with a comprehensive web page and SNMP capability for remote system management.

- **SCU+ (Standard Control Unit Plus)**

  The SCU+ provides Rectifier Module and optional Low Voltage Battery Disconnect (LVBD) or Low Voltage Load Disconnect (LVLD) control, metering functions, monitoring functions, and local/remote alarms. The SCU+ contains an LCD display and keypad for local access. It provides connection for binary inputs, programmable relay outputs, and a charge control function. The controller also supports rectifier temperature compensation if the system is equipped with a temperature probe (or multiple temperature probes connected via a Temperature Concentrator (SM TEMP), and ambient air temperature monitoring if equipped with a second temperature probe. The SCU+ also provides Ethernet connection and SNMP capability.

- **Distribution Unit**

  Various Distribution Unit options are available, as described in this document. The Distribution Unit can be equipped with an optional Low Voltage Battery Disconnect (LVBD) or Low Voltage Load Disconnect (LVLD) contactor.

Family:	NETSURE™
Spec. No.:	582136600
Model:	211NGFB
Input Voltage	Nominal 120/208/240 volts AC, single phase, 3-wire, 50/60 Hz, with an operating range of 100 to 250 volts. Acceptable input frequency range is 45 to 65 Hz.
Output Voltage:	-48 Volts DC
Output Capacity:	
Rectifier Module:	500W @ Vout >48Vdc (10.5A @ -48Vdc) or 1000W @ Vout >48Vdc (20.9A @ -48Vdc)

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System: See the following table.

System DC Output Capability								
Spec. No.	208/240VAC Input				120VAC Input			
	+40°C (+104°F)		+65°C (+149°F)		+40°C (+104°F)		+65°C (+149°F)	
	500W Rect.	1000W Rect.	500W Rect.	1000W Rect.	500W Rect.	1000W Rect.	500W Rect.	1000W Rect.
58213660001	20.8A	41.6A	12.6A	25A	20.8A	27.4A	12.6A	16.4A
58213660002	31.2A	62.4A	18.9A	37.5A	31.2A	41.1A	18.9A	24.6A
58213660005	41.6A	83.2A	25.2A	50A	41.6A	54.8A	25.2A	32.8A
58213660006	62.4A	124.8A	37.8A	75A	62.4A	82.2A	37.8A	49.2A

Agency Approval: UL 60950 Recognized, CAN/CSA 22.2

Framework Type: Relay Rack Mounted

Mounting Width: 19” or 23”, nominal

Mounting Depth: 12”

Mounting Height: 1.75” (1RU) or 3.5” (2RU)

Access: Front for Installation, Operation, and Maintenance

Control: Microprocessor

Color: Front Panels are Gray; Shelf is Galvaneal

List Options: 1RU High 19” Wide Shelf, 1RU High 23” Wide Shelf, 2RU High 19” Wide Shelf, 2RU High 23” Wide Shelf, SCU + Controller, ACU+ Controller, Rectifier Module (500W), Rectifier Module (1000W), Five (5) Load Lead Assemblies for 10A GMT Fuse Positions, Eight (8) Load Lead Assemblies for 10A GMT Fuse Positions, Five (5) Load Lead Assemblies for 15A GMT Fuse Positions), Shelf Side Battery Cables, Battery Side Battery Cables, Battery Cable, Optional External Battery Cables with Anderson Connector for (1) Battery String, Optional External Battery Cables with Anderson Connector for (2) Battery Strings, Relay Rack Earthquake Anchor Kit, Optional Temperature Probes, Battery Tray for 23” Relay Rack, Battery Tray for 19” Relay Rack, 1RU High Distribution Unit with (10) GMT Fuse Load Positions and with Low Voltage Battery Disconnect (LVBD), 1RU High Distribution Unit with (10) GMT Fuse Load Positions and w/out Low Voltage Disconnect, 2RU High Distribution Unit with (5) GMT Fuse Load Positions, (2) Circuit Breaker Load Positions, (2) Circuit Breaker Battery Disconnect Positions, and with Low Voltage Battery Disconnect (LVBD), 2RU High Distribution Unit with (5) GMT Fuse Load Positions, (2) Circuit Breaker Load Positions, (2) Circuit Breaker Battery Disconnect Positions, and with Low Voltage Load Disconnect (LVLD), 2RU High Distribution Unit with (5) GMT Fuse Load Positions, (2) Circuit Breaker Load Positions, (2) Circuit Breaker Battery Disconnect Positions, and w/out Low Voltage Disconnect, 2RU High Distribution Unit with (5) GMT Fuse Load Positions, (4) Circuit Breaker Load Positions, and with Low Voltage Battery Disconnect (LVBD), 2RU High Distribution Unit with (5) GMT Fuse Load Positions, (4) Circuit Breaker Load Positions, and with Low Voltage Load Disconnect (LVLD), 2RU High Distribution Unit with (5) GMT Fuse Load Positions, (4) Circuit

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	Breaker Load Positions, and w/out Low Voltage Disconnect, 2RU High Distribution Unit with (13) GMT Fuse Load Positions and with Low Voltage Battery Disconnect (LVBD), 2RU High Distribution Unit with (13) GMT Fuse Load Positions and with Low Voltage Load Disconnect (LVLD), 2RU High Distribution Unit with (13) GMT Fuse Load Positions and w/out Low Voltage Disconnect, 1RU High Load Distribution Panel with (20) GMT Fuse Load Positions
Accessory Options:	Relay Racks, Mounting and Adapter Kits, Distribution Devices, AC Input Cables and Line Cords, Ring & Distribution Module, External Battery Disconnect Unit, Battery Cabinets, SM TEMP Temperature Concentrator, Anderson Battery Connector, Digital Input and Relay Output Cables, Replacement Modules, Wiring Notes, Wiring Illustrations
Environment:	-40°C (-40°F) to +65°C (+149°F), with deratings (see SPECIFICATIONS section)

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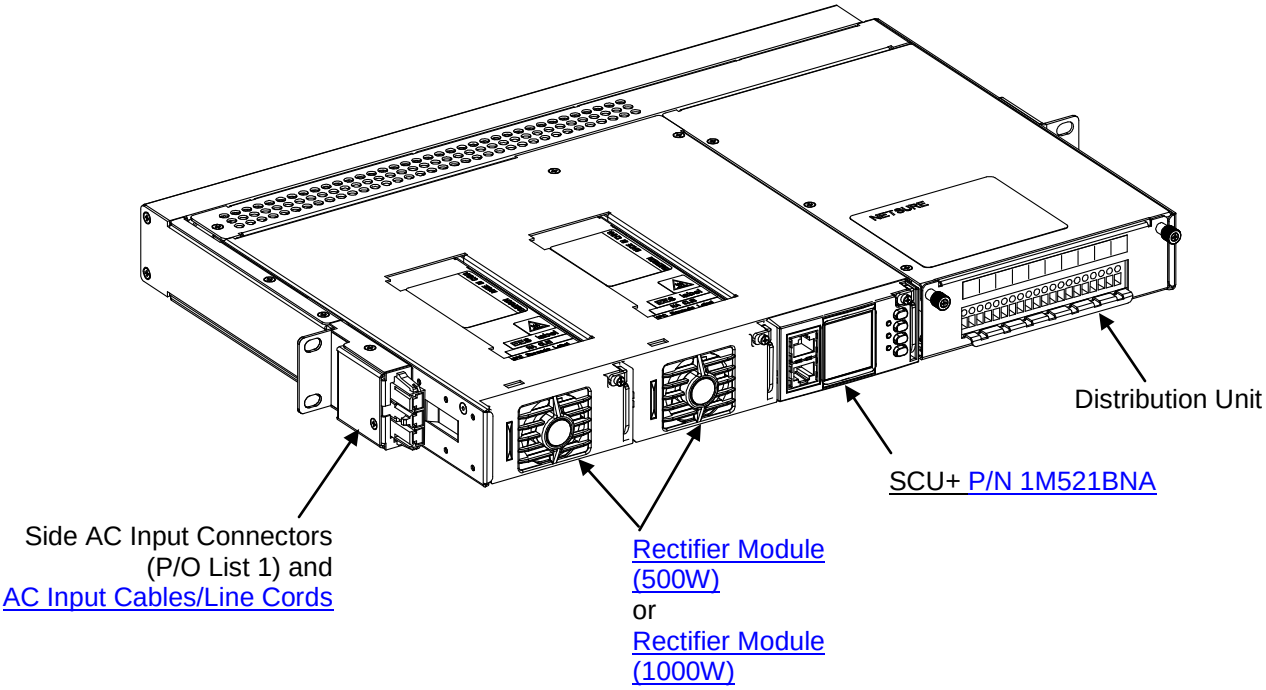
58213660001



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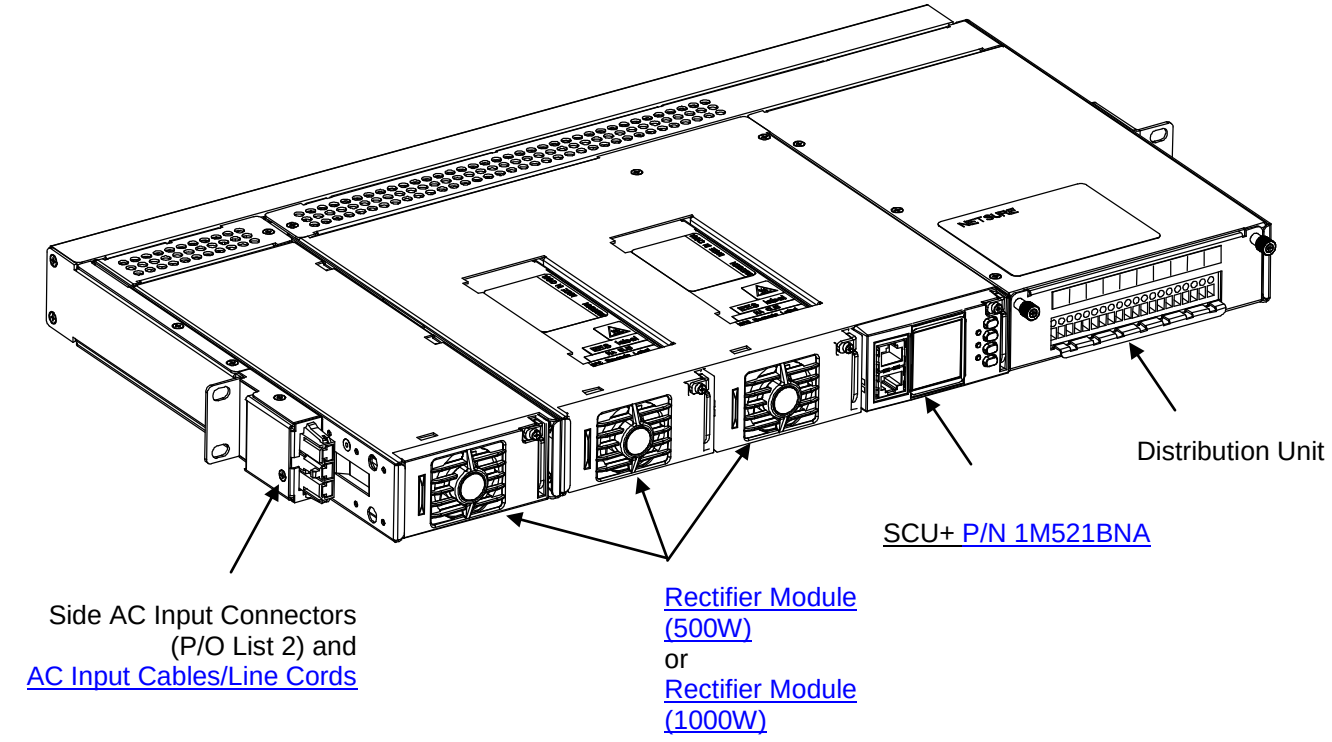

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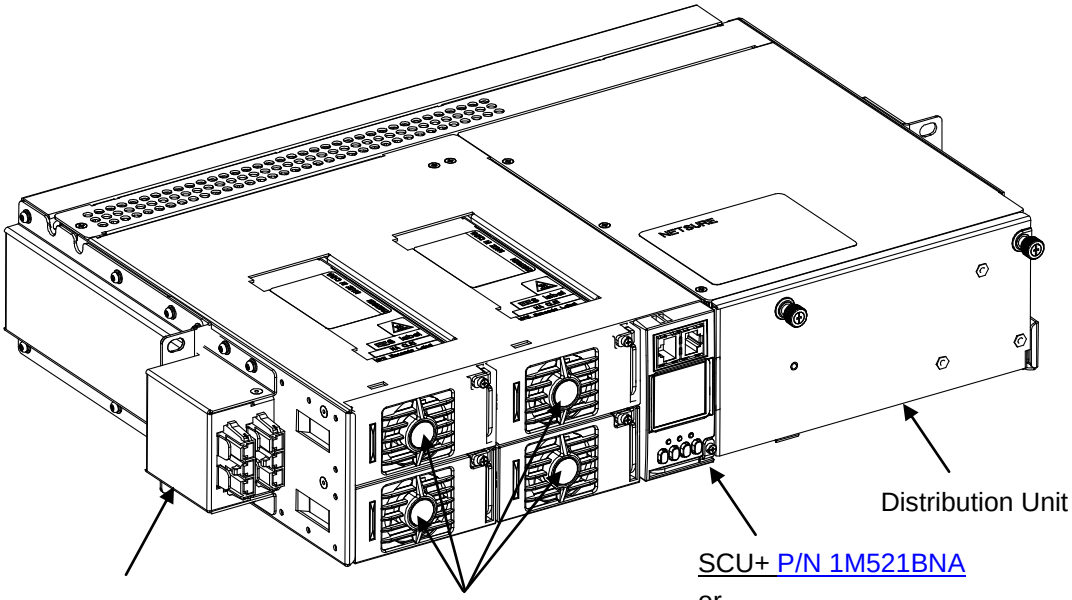
58213660005



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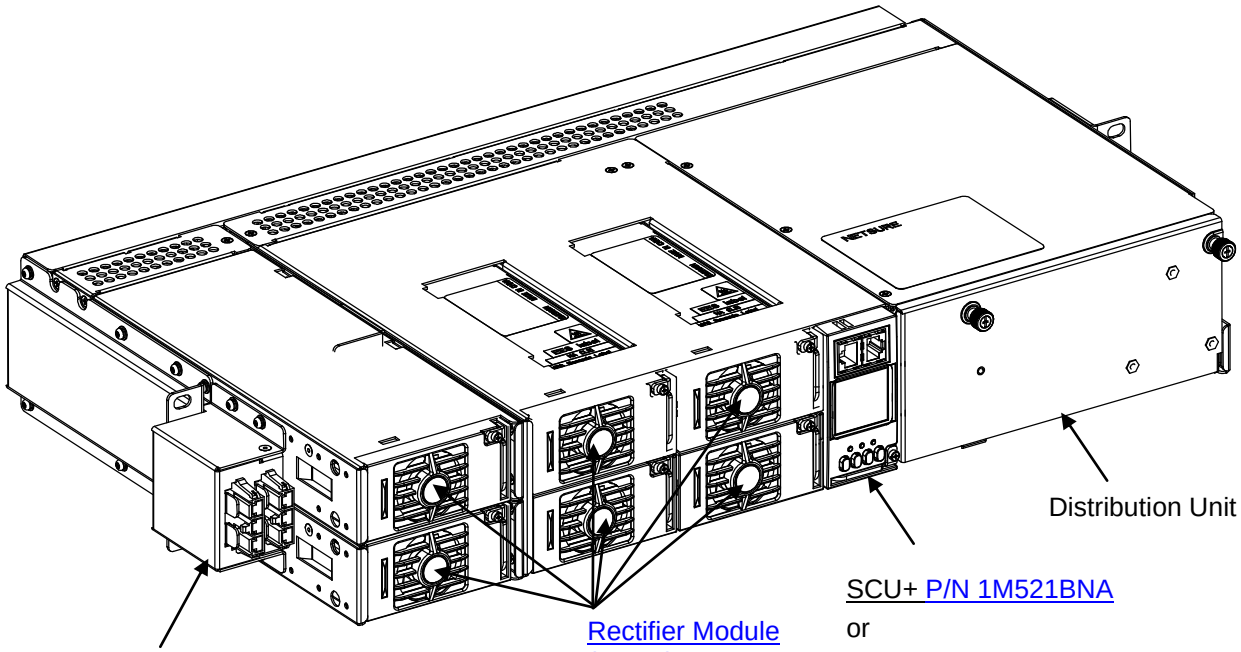

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DISTRIBUTION UNIT (Lists 1 and 2)

List BG: (10) GMT Fuse Load Positions
Low Voltage Battery Disconnect (LVBD)
(1) Set Battery Cables

List NG: (10) GMT Fuse Load Positions
NO Low Voltage Disconnect
(1) Set Battery Cables

DISTRIBUTION UNIT (Lists 5 and 6)

List BF: (13) GMT Fuse Load Positions
Low Voltage Battery Disconnect (LVBD)
(3) Battery Landing Points

List LF: (13) GMT Fuse Load Positions
Low Voltage Load Disconnect (LVLD)
(3) Battery Landing Points

List NF: (13) GMT Fuse Load Positions
NO Low Voltage Disconnect
(3) Battery Landing Points

List BC: (5) GMT Fuse Load Positions
(4) Bullet-Nose Circuit Breaker Load Positions
Low Voltage Battery Disconnect (LVBD)
(3) Battery Landing Points

List LC: (5) GMT Fuse Load Positions
(4) Bullet-Nose Circuit Breaker Load Positions
Low Voltage Load Disconnect (LVLD)
(3) Battery Landing Points

List NC: (5) GMT Fuse Load Positions
(4) Bullet-Nose Circuit Breaker Load Positions
NO Low Voltage Disconnect
(3) Battery Landing Points

List BA: (5) GMT Fuse Load Positions
(2) Bullet-Nose Circuit Breaker Load Positions
(2) Bullet-Nose Circuit Breaker Battery Disconnect Positions
Low Voltage Battery Disconnect (LVBD)

List LA: (5) GMT Fuse Load Positions
(2) Bullet-Nose Circuit Breaker Load Positions
(2) Bullet-Nose Circuit Breaker Battery Disconnect Positions
Low Voltage Load Disconnect (LVLD)

List NA: (5) GMT Fuse Load Positions
(2) Bullet-Nose Circuit Breaker Load Positions
(2) Bullet-Nose Circuit Breaker Battery Disconnect Positions
NO Low Voltage Disconnect

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Other List Options

List 60: Five (5) Load Lead Assemblies for 10A GMT Fuse Positions (for use w/ Lists BC, LC, NC, BA, LA, and NA)

List 61: Eight (8) Load Lead Assemblies for 10A GMT Fuse Positions (for use w/ Lists BF, LF, and NF)

List 62: Five (5) Load Lead Assemblies for 15A GMT Fuse Positions (for use w/ Lists BF, LF, and NF)

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List 71: Optional External Battery Cables with Anderson Connector for (1) Battery String (for use w/ Lists BG and NG)

List 72: Optional External Battery Cables with Anderson Connector for (2) Battery Strings (for use w/ Lists BG and NG)

List 89: Relay Rack Earthquake Anchor Kit

List 90: Temperature Probe (12 ft. total)

List 91: Temperature Probe (33 ft.total)

List 93: Battery Tray (23")

List 94: Battery Tray (19")

List KG: GMT Fuse Load Distribution Panel

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Mounting and Adapter Kits

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AC Input Cables and Line Cords

Ring & Distribution Module

External Battery Disconnect Unit

SM TEMP Temperature Concentrator

Anderson Battery Connector

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ORDERING INFORMATION

List Options

Order the following by the items Part Number as specified in the following table.

When viewing electronically, click on the *link* to jump to the detailed description page.

List Number	Part Number	Description
Shelf Options		
1	58213660001	1RU 19” Mini Shelf. (Shelf requires one [1] AC Feed) (Houses up to [2] Rectifiers, Controller, and Distribution Unit.)
2	58213660002	1RU 23” Mini Shelf. (Shelf requires one [1] AC Feed) (Houses up to [3] Rectifiers, Controller, and Distribution Unit.)
5	58213660005	2RU 19” Mini Shelf. (Shelf requires two [2] AC Feeds) (Houses up to [4] Rectifiers, Controller, and Distribution Unit.)
6	58213660006	2RU 23” Mini Shelf. (Shelf requires two [2] AC Feeds) (Houses up to [6] Rectifiers, Controller, and Distribution Unit.)
Controller Options		
Order by P/N	1M820BNA	ACU+ (Advanced Control Unit Plus)
Order by P/N	1M521BNA	SCU+ (Standard Control Unit Plus)
Rectifier Options		
Order by P/N	1R48500	Model R48-500 Rectifier Module (500W).
Order by P/N	1R481000	Model R48-1000 Rectifier Module (1000W).
Distribution Unit Options		
BF	582136600BF	Distribution Unit w/ • (1) Battery Shunt • (3) Battery Connection Points • (13) GMT Fuse Load Positions (5) 0A to 15A (8) 0A to 10A • Low Voltage Battery Disconnect (LVBD) FOR USE WITH LISTS 5 AND 6.

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List Number	Part Number	Description
Distribution Unit Options (Cont'd)		
LF	582136600LF	Distribution Unit w/ • (1) Battery Shunt • (3) Battery Connection Points • (13) GMT Fuse Load Positions (5) 0A to 15A (8) 0A to 10A • Low Voltage Load Disconnect (LVLD) FOR USE WITH LISTS 5 AND 6.
NF	582136600NF	Distribution Unit w/ • (1) Battery Shunt • (3) Battery Connection Points • (13) GMT Fuse Load Positions (5) 0A to 15A (8) 0A to 10A • **NO** Low Voltage Disconnect FOR USE WITH LISTS 5 AND 6.
BC	582136600BC	Distribution Unit w/ • (1) Battery Shunt • (3) Battery Connection Points • (5) GMT Fuse Load Positions (0A to 10A) • (4) Bullet-Nose Circuit Breaker Load Positions • Low Voltage Battery Disconnect (LVBD) FOR USE WITH LISTS 5 AND 6.
LC	582136600LC	Distribution Unit w/ • (1) Battery Shunt • (3) Battery Connection Points • (5) GMT Fuse Load Positions (0A to 10A) • (4) Bullet-Nose Circuit Breaker Load Positions • Low Voltage Load Disconnect (LVLD) FOR USE WITH LISTS 5 AND 6.
NC	582136600NC	Distribution Unit w/ • (1) Battery Shunt • (3) Battery Connection Points • (5) GMT Fuse Load Positions (0A to 10A) • (4) Bullet-Nose Circuit Breaker Load Positions • **NO** Low Voltage Disconnect FOR USE WITH LISTS 5 AND 6.

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List Number	Part Number	Description
Distribution Unit Options (Cont'd)		
BA	582136600BA	Distribution Unit w/ • (1) Battery Shunt • (5) GMT Fuse Load Positions (0A to 10A) • (2) Bullet-Nose Circuit Breaker Load Positions • (2) Bullet-Nose Circuit Breaker Battery Disconnect Positions • Low Voltage Battery Disconnect (LVBD) FOR USE WITH LISTS 5 AND 6.
LA	582136600LA	Distribution Unit w/ • (1) Battery Shunt • (5) GMT Fuse Load Positions (0A to 10A) • (2) Bullet-Nose Circuit Breaker Load Positions • (2) Bullet-Nose Circuit Breaker Battery Disconnect Positions • Low Voltage Load Disconnect (LVLD) FOR USE WITH LISTS 5 AND 6.
NA	582136600NA	Distribution Unit w/ • (1) Battery Shunt • (5) GMT Fuse Load Positions (0A to 10A) • (2) Bullet-Nose Circuit Breaker Load Positions • (2) Bullet-Nose Circuit Breaker Battery Disconnect Positions • **NO** Low Voltage Disconnect FOR USE WITH LISTS 5 AND 6.
BG	582136600BG	Distribution Unit w/ • (1) Set Battery Cables • (10) GMT Fuse Load Positions (0A to 15A) • Low Voltage Battery Disconnect (LVBD) FOR USE WITH LISTS 1 AND 2.
NG	582136600NG	Distribution Unit w/ • (1) Set Battery Cables • (10) GMT Fuse Load Positions (0A to 15A) • **NO** Low Voltage Disconnect FOR USE WITH LISTS 1 AND 2.
Other Options		
60	58213660060	Five (5) Load Lead Assemblies for 10A GMT Fuse Positions. Leads are 12' long and 16 AWG. For use with Lists BC, LC, NC, BA, LA, and NA.
61	58213660061	Eight (8) Load Lead Assemblies for 10A GMT Fuses Positions. Leads are 12' long and 16 AWG. For use with Lists BF, LF, and NF.

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List Number	Part Number	Description
Other Options (Cont'd)		
62	58213660062	Five (5) Load Lead Assemblies for 15A GMT Fuse Positions. Leads are 12' long and 14 AWG. For use with Lists BF, LF, and NF.
65	58213660065	Shelf Side Battery Cables. Cables are 3' long and 2 AWG terminated in a 2-position Anderson connector. Remaining end terminated in lugs for connection to shelf. For use with Lists BF, LF, NF, BC, LC, and NC.
66	58213660066	Battery Side Battery Cables. Cables are 12' long and 2 AWG terminated in a 2-position Anderson connector. Remaining end un-terminated for connection to batteries. For use with Lists BF, LF, NF, BC, LC, and NC.
67	58213660067	Output Cable to Battery Cabinet – cables are 4' long and 8 AWG terminated in a 2-position Anderson connector. Remaining end terminated in lugs for connection to shelf. For Use with Lists BC, LC, NC, BF, LF, and NF.
71	58213600071	Optional External Battery Cables with Anderson Connector for (1) Battery String. For use with Lists BG and NG.
72	58213600072	Optional External Battery Cables with Anderson Connector for (2) Battery Strings. For use with Lists BG and NG.
89	58213660089	Relay Rack Earthquake Anchor Kit.
90	58213660090	Temperature Probe, 9 ft long.
91	58213660091	Temperature Probe, 30 ft. long.
93	58213660093	Battery Tray (23").
94	58213660094	Battery Tray (19").
KG	582136600KG	Distribution Panel w/ • (20) GMT Fuse Load Positions (0A to 15A) • **NO** Internal Low Voltage Disconnect (In systems e/w LVLD, List KG is disconnected.) FOR USE WITH LISTS 5 AND 6.

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Accessory Options

Order the following by the items Part Number as specified in the following table.

When viewing electronically, click on the *link* to jump to the detailed description page.

Description	Part Number
Relay Racks	See ACCESSORY DESCRIPTIONS Section
Distribution Devices	
AC Input Cables and Line Cords	
Ring & Distribution Module	
External Battery Disconnect Unit	
Battery Cabinet	
SM TEMP Temperature Concentrator	
Anderson Battery Connector	
Digital Input and Relay Output Cables	
Replacement Modules	
Wiring Notes Wiring Illustrations	

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LIST DESCRIPTIONS

List 1: 1RU High by 19" Wide Shelf

Features

- Consists of a 1RU high by 19" wide shelf.
- Two (2) 8 AWG 48" long battery cables are factory connected inside the shelf. These cables are terminated at the customer end in a Red SB50 Anderson battery connector. A mating Anderson battery connector is provided [Housing: Emerson P/N 138922, Anderson Power Products P/N 992G1. Contacts (two provided): Emerson P/N 247109602, Anderson Power Products P/N 5952].
- Mounted to the side of the shelf is an AC input housing with plug-in connector for a single AC input feed.
- The "Digital Input and Relay Outputs Cable" P/N 545494 (shelf side) is factory connected inside the shelf. A mating half is available.
- The shelf houses up to two (2) Rectifier Modules, one (1) Controller, and one (1) Distribution Unit.

Restrictions

Each List 1 shelf holds up to two (2) Rectifier Modules.

Ordering Notes

1) Order List 1 as required.
   Also order the following as required.
2) Order one (1) SCU+ controller (P/N 1M521BNA) per shelf. Also specify the appropriate configuration file for your site.
3) Order up to two (2) Rectifier Modules per shelf: P/N 1R48500 (500W) or P/N 1R481000 (1000W).
4) Order AC Input Cables or Line Cords as required. Note that each List 1 shelf requires one (1) AC Input Cable or Line Cord.
5) Order one (1) Distribution Unit (List BG or NG) per shelf.
6) Order Optional External Battery Cables with Anderson Connector for one (1) to two (2) Battery Strings per List 71 or 72.
7) Order Relay Rack Anchor Kit(s) (List 89) as required.
8) Order up to two (2) Temperature Probes (List 90 or 91) as required. One probe is used with the Battery Charge Temperature Compensation feature, the other to monitor ambient air temperature.
9) Order Battery Trays (List 94) as required.
10) Order Relay Racks per ACCESSORY DESCRIPTIONS section.
11) Order Distribution Devices per ACCESSORY DESCRIPTIONS section.
12) Order External Battery Disconnect Unit per ACCESSORY DESCRIPTIONS section.
13) Order Battery Cabinet per ACCESSORY DESCRIPTIONS section.
14) Order Mating Digital Input/Relay Output Cables per ACCESSORY DESCRIPTIONS section.
15) Order Spare Anderson Battery Connector per ACCESSORY DESCRIPTIONS section.

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List 2: 1RU High by 23" Wide Shelf

Features

- Consists of a 1RU high by 23" wide shelf.
- Two (2) 8 AWG 48" long battery cables are factory connected inside the shelf. These cables are terminated at the customer end in a Red SB50 Anderson battery connector. A mating Anderson battery connector is provided [Housing: Emerson P/N 138922, Anderson Power Products P/N 992G1. Contacts (two provided): Emerson P/N 247109602, Anderson Power Products P/N 5952].
- Mounted to the side of the shelf is an AC input housing with plug-in connector for a single AC input feed.
- The "Digital Input and Relay Outputs Cable" P/N 545494 (shelf side) is factory connected inside the shelf. A mating half is available.
- The shelf houses up to three (3) Rectifier Modules, one (1) Controller, and one (1) Distribution Unit.

Restrictions

Each List 2 shelf holds up to three (3) Rectifier Modules.

Ordering Notes

1) Order List 2 as required.
   Also order the following as required.
2) Order one (1) SCU+ controller (P/N 1M521BNA) per shelf. Also specify the appropriate configuration file for your site.
3) Order up to three (3) Rectifier Modules per shelf: P/N 1R48500 (500W) or P/N 1R481000 (1000W).
4) Order AC Input Cables or Line Cords as required. Note that each List 2 shelf requires one (1) AC Input Cable or Line Cord.
5) Order one (1) Distribution Unit (List BG or NG) per shelf.
6) Order Optional External Battery Cables with Anderson Connector for one (1) to two (2) Battery Strings per List 71 or 72.
7) Order Relay Rack Anchor Kit(s) (List 89) as required.
8) Order up to two (2) Temperature Probes (List 90 or 91) as required. One probe is used with the Battery Charge Temperature Compensation feature, the other to monitor ambient air temperature.
9) Order Battery Trays (List 93) as required.
10) Order Relay Racks per ACCESSORY DESCRIPTIONS section.
11) Order Distribution Devices per ACCESSORY DESCRIPTIONS section.
12) Order External Battery Disconnect Unit per ACCESSORY DESCRIPTIONS section.
13) Order Battery Cabinet per ACCESSORY DESCRIPTIONS section.
14) Order Mating Digital Input/Relay Output Cables per ACCESSORY DESCRIPTIONS section.
15) Order Spare Anderson Battery Connector per ACCESSORY DESCRIPTIONS section.

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List 5: 2RU High by 19" Wide Shelf

Features

- Consists of a 2RU high by 19" wide shelf.
- Mounted to the side of the shelf is an AC input housing with plug-in connectors for two (2) AC input feeds.
- Includes the Customer Interface Board that provides additional Relay Outputs and Digital Inputs.
- The "Relay Outputs Cable" P/N 541308 (shelf side) is factory connected inside the shelf. A mating half is available. A "Digital Input Cable" (shelf side and customer side) is also available.
- The shelf houses up to four (4) Rectifier Modules, one (1) Controller, and one (1) Distribution Unit.

Restrictions

Each List 5 shelf holds up to four (4) Rectifier Modules.

Ordering Notes

1) Order List 5 as required.
   Also order the following as required.
2) Order one (1) SCU+ controller (P/N 1M521BNA) or (1) ACU+ controller (P/N 1M820BNA) per shelf. Also specify the appropriate configuration file for your site.
3) Order up to four (4) Rectifier Modules per shelf: P/N 1R48500 (500W) or P/N 1R481000 (1000W).
4) Order AC Input Cables or Line Cords as required. Note that each List 5 shelf requires two (2) AC Input Cables or Line Cords.
5) Order one (1) Distribution Unit (List BF, LF, NF, BC, LC, NC, BA, LA, or NA) per shelf.
6) Order one (1) List 60 for each List BC, LC, NC, BA, LA, or NA ordered.
   Each List 60 provides five (5) Load Lead Assemblies for 10A GMT Fuse Positions.

   Order one (1) List 61 for each List BF, LF, or NF ordered.
   Each List 61 provides eight (8) Load Lead Assemblies for 10A GMT Fuse Positions.

   Order one (1) List 62 for each List BF, LF, or NF ordered.
   Each List 62 provides five (5) Load Lead Assemblies for 15A GMT Fuse Positions.
7) Order one (1) List KG Distribution Fuse Panel per shelf, as required.
8) Order three (3) sets of Shelf Side and three (3) sets of Battery Side Battery Cables (List 65 and List 66) for each List BC, LC, NC, BF, LF, or NF ordered.
9) Order up to three (3) List 67 for each List BC, LC, NC, BF, LF, and NF ordered.
10) Order Relay Rack Anchor Kit(s) (List 89) as required.
11) Order up to two (2) Temperature Probes (List 90 or 91) as required. One probe is used with the Battery Charge Temperature Compensation feature, the other to monitor ambient air temperature.
12) Order Battery Trays (List 94) as required.
13) Order Relay Racks per ACCESSORY DESCRIPTIONS section.
14) Order Distribution Devices per ACCESSORY DESCRIPTIONS section.
15) Order External Battery Disconnect Unit per ACCESSORY DESCRIPTIONS section.
16) Order Battery Cabinet per ACCESSORY DESCRIPTIONS section.
17) Order Digital Input/Relay Output Cables per ACCESSORY DESCRIPTIONS section.
18) Order lugs per Wiring Notes under ACCESSORY DESCRIPTIONS section.

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List 6: 2RU High by 23" Wide Shelf

Features

- Consists of a 2RU high by 23" wide shelf.
- Mounted to the side of the shelf is an AC input housing with plug-in connectors for two (2) AC input feeds.
- Includes the Customer Interface Board that provides additional Relay Outputs and Digital Inputs.
- The "Relay Outputs Cable" P/N 541308 (shelf side) is factory connected inside the shelf. A mating half is available. A "Digital Input Cable" (shelf side and customer side) is also available.
- The shelf houses up to six (6) Rectifier Modules, one (1) Controller, and one (1) Distribution Unit.

Restrictions

Each List 6 shelf holds up to six (6) Rectifier Modules.

Ordering Notes

1) Order List 6 as required.
   Also order the following as required.
2) Order one (1) SCU+ controller (P/N 1M521BNA) or (1) ACU+ controller (P/N 1M820BNA) per shelf. Also specify the appropriate configuration file for your site.
3) Order up to six (6) Rectifier Modules per shelf: P/N 1R48500 (500W) or P/N 1R481000 (1000W).
4) Order AC Input Cables or Line Cords as required. Note that each List 6 shelf requires two (2) AC Input Cables or Line Cords.
5) Order one (1) Distribution Unit (List BF, LF, NF, BC, LC, NC, BA, LA, or NA) per shelf.
6) Order one (1) List 60 for each List BC, LC, NC, BA, LA, or NA ordered.
   Each List 60 provides five (5) Load Lead Assemblies for 10A GMT Fuse Positions.

   Order one (1) List 61 for each List BF, LF, or NF ordered.
   Each List 61 provides eight (8) Load Lead Assemblies for 10A GMT Fuse Positions.

   Order one (1) List 62 for each List BF, LF, or NF ordered.
   Each List 62 provides five (5) Load Lead Assemblies for 15A GMT Fuse Positions.
7) Order one (1) List KG GMT Distribution Fuse Panel per shelf, as required.
8) Order three (3) sets of Shelf Side and three (3) sets of Battery Side Battery Cables (List 65 and List 66) for each List BC, LC, NC, BF, LF, or NF ordered.
9) Order up to three (3) List 67 for each List BC, LC, NC, BF, LF, and NF ordered.
10) Order Relay Rack Anchor Kit(s) (List 89) as required.
11) Order up to two (2) Temperature Probes (List 90 or 91) as required. One probe is used with the Battery Charge Temperature Compensation feature, the other to monitor ambient air temperature.
12) Order Battery Trays (List 93) as required.
13) Order Relay Racks per ACCESSORY DESCRIPTIONS section.
14) Order Distribution Devices per ACCESSORY DESCRIPTIONS section.
15) Order External Battery Disconnect Unit per ACCESSORY DESCRIPTIONS section.
16) Order Battery Cabinet per ACCESSORY DESCRIPTIONS section.
17) Order Digital Input/Relay Output Cables per ACCESSORY DESCRIPTIONS section.
18) Order lugs per Wiring Notes under ACCESSORY DESCRIPTIONS section.

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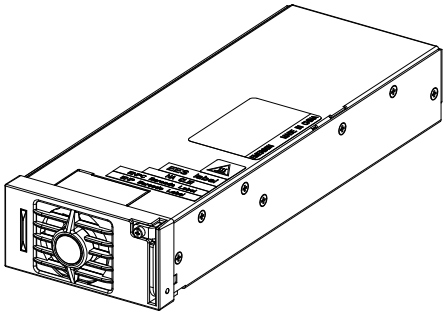
Rectifier Module (500W), P/N 1R48500

Features

- Provides one (1) Model R48-500, Spec. No. 1R48500, 500 watt / 48 volt Rectifier Module.



Restrictions

Each List 1 Shelf holds up to two (2) Rectifier Modules.

Each List 2 Shelf holds up to three (3) Rectifier Modules.

Each List 5 Shelf holds up to four (4) Rectifier Modules.

Each List 6 Shelf holds up to six (6) Rectifier Modules.

DO NOT install different wattage Rectifier Modules in same shelf.

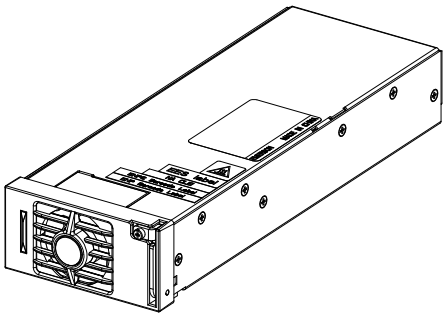
Ordering Notes

1) Order by P/N (1R48500) as required.

Rectifier Module (1000W), P/N 1R481000

Features

- Provides one (1) Model R48-1000, Spec. No. 1R481000, 1000 watt / 48 volt Rectifier Module.



Restrictions

Each List 1 Shelf holds up to two (2) Rectifier Modules.

Each List 2 Shelf holds up to three (3) Rectifier Modules.

Each List 5 Shelf holds up to four (4) Rectifier Modules.

Each List 6 Shelf holds up to six (6) Rectifier Modules.

DO NOT install different wattage Rectifier Modules in same shelf.

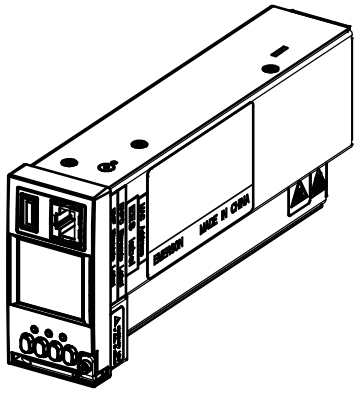
Ordering Notes

1) Order by P/N (1R481000) as required.

ACU+ (Advanced Control Unit Plus), P/N 1M820BNA

Features

- Provides the ACU+ Controller.
- Factory programmed with the configuration file specified when ordered.



Restrictions

ACU+ is **not** available in List 1 or List 2 shelves.

Each List 5 or List 6 shelf must contain one (1) SCU+ or one (1) ACU+ Controller.

Ordering Notes

1) Order one (1) ACU+ (P/N 1M820BMA) or one (1) SCU+ Controller (P/N 1M521BNA) or for each shelf.

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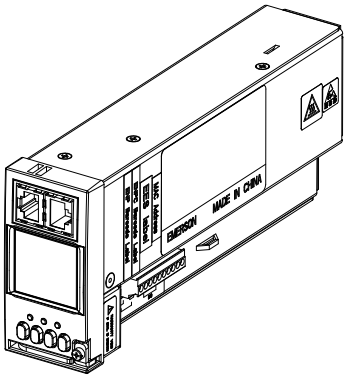
SCU+ (Standard Control Unit Plus), P/N 1M521BNA

Features



- Provides the SCU+ Controller.
- Factory programmed with the configuration file specified when ordered.

Restrictions

Each shelf must contain one (1) SCU+ or one (1) ACU+ Controller.

Ordering Notes

1) Order one (1) SCU+ Controller (P/N 1M521BNA) or one (1) ACU+ (P/N 1M820BMA) for each shelf.
   For the SCU+ controller, specify also one of the following configurations.

   Note: *For custom SCU+ configurations, contact Emerson.*

   a) List 1 and 2 **with** Low Voltage Disconnect: 545304.

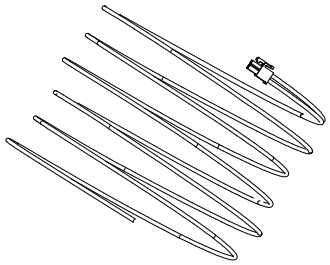
   b) List 1 and 2 **without** Low Voltage Disconnect: 545305.

   c) List 5 and 6 **with** Low Voltage Disconnect: 545298.

   d) List 5 and 6 **without** Low Voltage Disconnect: 545299.

List 60: Five (5) Load Lead Assemblies (P/N 535206) for 10A GMT Fuse Positions

Features



- Provides 12' long, 16 AWG, load and load return leads that are terminated on one end with the appropriate mating connector to plug into the system's 10A GMT fuse connector on a List BC, LC, NC, BA, LA, or NA Distribution Unit, and are left un-terminated at the remaining end for connection into customer loads.

Restrictions

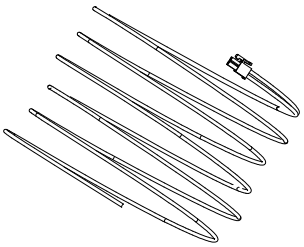
For use with List BC, LC, NC, BA, LA, and NA Distribution units only.

Ordering Notes

1) Order one (1) List 60 for each List BC, LC, NC, BA, LA, or NA Distribution Unit.
   Each List 60 provides five (5) GMT fuse load lead assemblies, P/N 535206.

List 61: Eight (8) Load Lead Assemblies (P/N 535206) for 10A GMT Fuse Positions

Features



- Provides 12' long, 16 AWG, load and load return leads that are terminated on one end with the appropriate mating connector to plug into the system's 10A GMT fuse connector on a List BF, LF, or NF Distribution Unit, and are left un-terminated at the remaining end for connection into customer loads.

Restrictions

For use with List BF, LF, and NF Distribution units only.

Ordering Notes

1) Order one (1) List 61 for each List BF, LF, or NF Distribution Unit.
   Each List 61 provides eight (8) GMT fuse load lead assemblies, P/N 535206.

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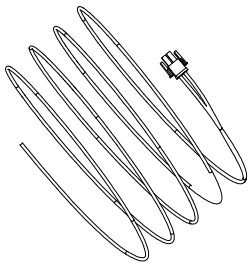
List 62: Five (5) Load Lead Assemblies (P/N 540988) for 15A GMT Fuse Positions

Features

- Provides 12' long, 14 AWG, load and load return leads that are terminated on one end with the appropriate mating connector to plug into the system's 15A GMT fuse connector on a List BF, LF, or NF Distribution Unit, and are left un-terminated at the remaining end for connection into customer loads.



Restrictions

For use with List BF, LF, and NF Distribution units only.

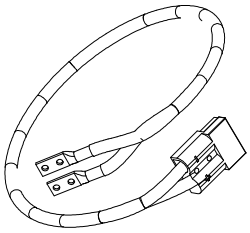
Ordering Notes

1) Order one (1) List 62 for each List BF, LF, or NF Distribution Unit.
   Each List 62 provides five (5) GMT fuse load lead assemblies, P/N 540988.

List 65: Shelf Side Battery Cables, P/N 540814

Features

- Provides two (2) 3' long, 2 AWG, battery cables terminated in a 2-position Red SB120 Anderson connector (mates with the Anderson connector on List 66). Remaining end terminated in lugs for connection to shelf.



Restrictions

For use with List BF, LF, NF, BC, LC, and NC Distribution units only.

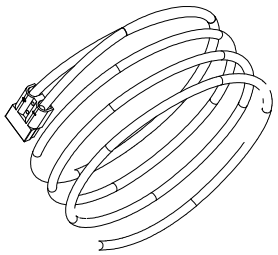
Ordering Notes

1) Order as required. Each shelf provides landings for up to three (3) battery strings.

List 66: Battery Side Battery Cables, P/N 540954

Features

- Provides two (2) 12' long, 2 AWG, battery cables terminated in a 2-position Red SB120 Anderson connector (mates with the Anderson connector on List 65). Remaining end un-terminated for connection to batteries.



Restrictions

For use with List BF, LF, NF, BC, LC, and NC only.

Ordering Notes

1) Order as required. Each shelf provides landings for up to three (3) battery strings.

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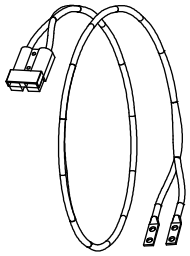
List 67: Battery Cable, P/N 545709

Features



- Provides two (2) 4' long, 8 AWG, battery cables terminated in a 2-position Anderson connector on the battery side. Remaining end terminated in lugs for connection to shelf.

Restrictions

For use with P/N 541434, P/N 545534 or P/N 545506 Battery cabinets only.

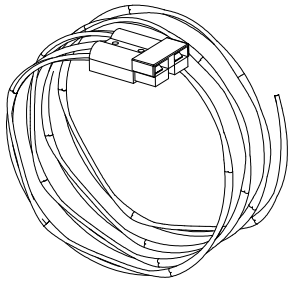
For use with List BF, LF, NF, BC, LC, and NC Distribution units only.

Ordering Notes

1) Order up to three (3) List 67 for each List BC, LC, NC, BF, LF, and NF ordered.
2) Order one (1) for each battery cabinet feed required.

List 71: Optional External Battery Cable Assembly with Anderson Connector for (1) Battery String, P/N 545493

Features



- Provides two (2) 6' long, 8 AWG, battery cables terminated in a Red SB50 Anderson connector for connecting one (1) battery string to the system.
- One end of the assembly connects to the Anderson connector factory wired to the shelf's battery connection points, and the other end contains two (2) un-terminated cables for connection into a customer battery string.

Restrictions

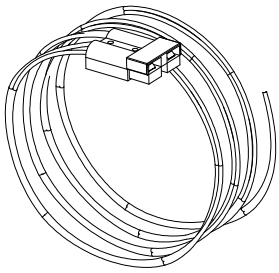
For use with List BG and NG only.

Ordering Notes

1) Order if required.
2) Order Spare Anderson Battery Connector per ACCESSORY DESCRIPTIONS section.

List 72: Optional External Battery Cable Assembly with Anderson Connector for (2) Battery Strings, P/N 535124

Features



- Provides four (4) 6' long, 10 AWG, battery cables terminated in a Red SB50 Anderson connector for connecting two (2) battery strings to the system.
- One end of the assembly connects to the Anderson connector factory wired to the shelf's battery connection points, and the other end contains four (4) un-terminated cables for connection into customer battery strings.

Restrictions

For use with List BG and NG Distribution units only.

Ordering Notes

1) Order if required.
2) Order Spare Anderson Battery Connector per ACCESSORY DESCRIPTIONS section.

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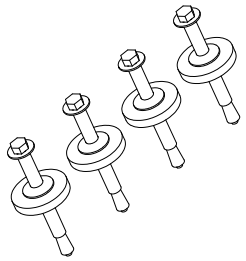
List 89: Relay Rack Earthquake Anchor Kit, P/N P0987167

Features

- Provides four (4) sets of hardware for anchoring the relay rack to the floor.



Ordering Notes

1) Order as required.

List 90: Optional Temperature Probe, P/N 04118246 (shelf side half) and P/N 04118247 (probe side half, 9 ft. long)

Features

- Two Temperature Probes can be connected to this system. One to provide Battery Charge Temperature Compensation and the other to monitor ambient air temperature. Each probe plugs into the IB2 Board.

- The Temperature Probe used for Battery Charge Temperature Compensation is mounted near the battery to sense battery ambient temperature. This allows the Controller to automatically increase or decrease the output voltage of the system to maintain battery float current as battery ambient temperature decreases or increases, respectively. Battery life can be extended when an optimum charge voltage to the battery with respect to temperature is maintained.
- The Temperature Probe consists of two pieces that plug together to make a complete probe. When ordered, P/N 04118246 (3 feet long) is pre-wired to the shelf and P/N 04118247 (9 feet long) is shipped loose. Total length: 12 ft.

Ordering Notes

1) Order up to two (2) Temperature Probes for each shelf, as required.
   Each List 90 includes one (1) P/N 04118246 and one (1) P/N 04118247.
2) For a Temperature Probe with a longer cable see List 91.

List 91: Optional Temperature Probe, P/N 04118246 (shelf side half) and P/N 04116740 (probe side half, 30 ft. long)

Features

- Two Temperature Probes can be connected to this system. One to provide Battery Charge Temperature Compensation and the other to monitor ambient air temperature. Each probe plugs into the IB2 Board.

- The Temperature Probe used for Battery Charge Temperature Compensation is mounted near the battery to sense battery ambient temperature. This allows the Controller to automatically increase or decrease the output voltage of the system to maintain battery float current as battery ambient temperature decreases or increases, respectively. Battery life can be extended when an optimum charge voltage to the battery with respect to temperature is maintained.
- The Temperature Probe consists of two pieces that plug together to make a complete probe. When ordered, P/N 04118246 (3 feet long) is pre-wired to the shelf and P/N 04116740 (30 feet long) is shipped loose. Total Length: 33 ft.

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Ordering Notes

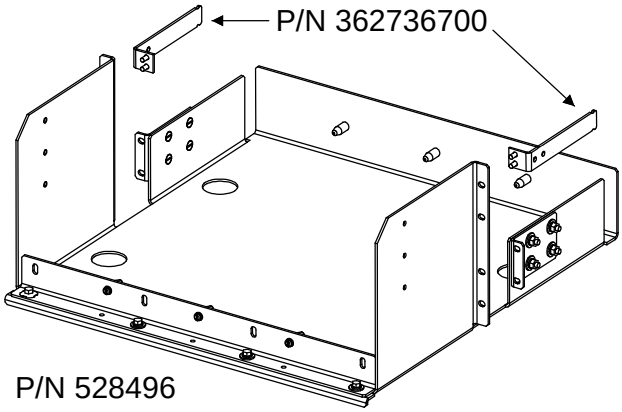
1) Order up to two (2) Temperature Probes for each shelf, as required. Each List 91 includes one (1) P/N 04118246 and one (1) P/N 04116740.

2) For a Temperature Probe with a shorter cable see List 90.

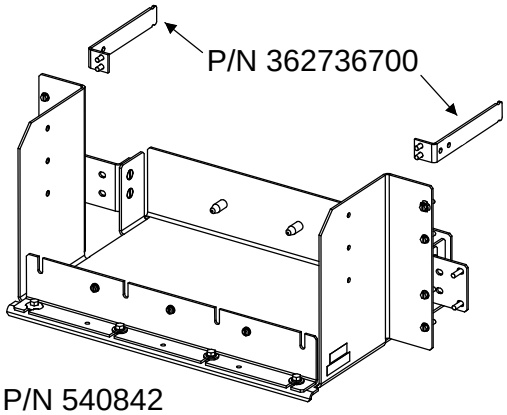
List 93: Battery Tray for 23" Relay Rack

Features

- Provides one battery tray that mounts four (4) 12V front terminal Valve Regulated Lead Acid (VRLA) batteries. Batteries are configured as one (1) 48V string.
- Accepts various VRLA batteries. See **Ordering Notes** below.
- See Overall Dimensions - 23" Battery Tray under *PHYSICAL SIZE INFORMATION* for battery tray dimensions and typical arrangement. Note that two battery trays are available to accommodate the various size batteries listed in the **Ordering Notes** tables.
- Trays can be ordered with or without battery disconnect circuit breakers. When circuit breakers are ordered, one is provided in the -48V lead of each battery string (1 circuit breaker per tray).
- Battery cables are available terminated at the power system end in an Anderson connector. Battery lugs are available for the remaining end.



P/N 528496



P/N 540842

Restrictions

For 23" relay racks only.

Maximum number of List 93's per rack is three (3).

A single List 93 must mount at bottom of rack. Multiple List 93's must mount starting at bottom of rack and working upward.

Ordering Notes

1) Order multiples of List 93 for more than one (1) battery tray. See **Restrictions** above.

2) Order one (1) or more P/N 362736700 Cable Bracket(s) as required.

3) Order batteries separately. The following tables list batteries recommended for use with List 93.

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Battery Tray P/N 528496						
Manufacturer*	**Model**	**Emerson Network Power P/N**	**Rated 8-Hr. Capacity (Ah)**	**Dimension W x L x H (Inches)**	**Required Tray Spacing**	**Weight (per battery) (lbs)**
GNB Marathon	M12V125FT	--	125	4.90 X 22.00 X 11.15	7U	105
GNB Marathon	M12V155FT	112795	155	4.90 X 22.00 X 11.15	7U	119
Northstar	NSB110FT	--	110	4.92 X 22.05 X 8.94	7U	91.3
Northstar	NSB170FT	--	167	4.92 X 22.05 X 12.60	8U	131
Deka Unigy I	12AVR-150ET	122018	150	4.90 X 22.00 X 11.75	8U	115
C&D	FA 12-150F	FA12150	150	4.92 X 21.97 X 12.70	8U	131
Douglas	DGS12-150F	125453	150	4.90 X 22.00 X 12.70	8U	137
Douglas	DSN12-170F	--	170.8	4.92 X 22.05 X 12.60	8U	129.6

** See Battery Manufacturer Information located at the end of this document.*

Battery Tray P/N 540842						
Manufacturer*	**Model**	**Emerson Network Power P/N**	**Rated 8-Hr. Capacity (Ah)**	**Dimension W x L x H (Inches)**	**Required Tray Spacing**	**Weight (per battery) (lbs)**
GNB Marathon	M12V35FT	--	35	4.21 X 11.02 X 7.44	6U	31
GNB Marathon	M12V50FT	--	47	4.21 X 11.02 X 9.09	7U	40
GNB Marathon	M12V60FT	--	59	4.21 X 11.02 X 10.35	7U	51
Northstar	NSB40FT**	--	38.1	3.80 X 9.80 X 8.20	6U	34
Northstar	NSB60FT**	--	57.9	4.20 X 11.30 X 10.40	7U	49
Douglas	DGS12-25F	--	25	3.94 X 10.80 X 7.60	6U	27
Douglas	DGS12-50F	--	50	3.94 X 10.80 X 11.60	8U	48

** See Battery Manufacturer Information located at the end of this document.*
*** Batteries MUST be equipped with front access terminal option. See Battery Manufacturer for ordering information.*

4) Specify rack spacing of 6U (10.5”), 7U (12.25”), or 8U (14”) between trays and above top tray as required for battery clearance. See table above.

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5) Battery lugs are provided, as specified from the following table.

Battery Specified	Battery Lug Kit Part Number (Kit provides two lugs for one tray.)	
	Lists 5 and 6	Lists 1 and 2
GNB Marathon M12V125FT	528234	540989 (for use with 10 AWG wire and List 72) 545581 (for use with 8 AWG wire and List 71)
GNB Marathon M12V155FT		
Northstar NSB110FT		
Northstar NSB170FT		
Deka Unigy I 12AVR-150ET		
C&D FA 12-150F		
Douglas DGS12-150F	528236	
Douglas DSN12-170F	528234	
GNB Marathon M12V35FT		
GNB Marathon M12V50FT		
GNB Marathon M12V60FT		
Northstar NSB40FT		
Northstar NSB60FT		
Douglas DGS12-25F		
Douglas DGS12-50F		

6) Specify with or without battery disconnect circuit breakers. If ordering List 93 with circuit breakers, order one (1) circuit breaker per List 93 from the following table. Also specify breaker mounting on left side of tray, right side of tray, or remote mounting. **Note:** *All List 93 trays in a rack will be furnished with or without battery disconnect circuit breakers as specified for the first tray ordered.*

Also order Alarm Jumper P/N 524384 for each system to connect the alarm terminal of up to three (3) battery disconnect circuit breakers.

Ampere Rating	P/N Electrical/Mechanical Trip[1] (Black Handle)	Ampere Rating	P/N Electrical/Mechanical Trip[1] (Black Handle)
1	256690300	35	256693500
3	256690700	40	256693900
5	256691100	50	256694300
10	256691500	60	256694700
15	256691900	70	256695100
20	256692300	75	256695500
25	256692700	100	256695900
30	256693100		

Circuit Breaker Alarm Operation:
[1] Provides an alarm during an electrical or manual trip condition.

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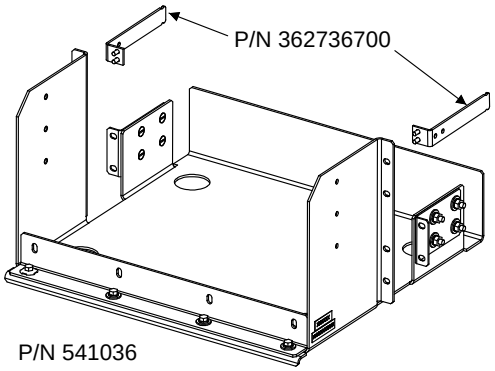
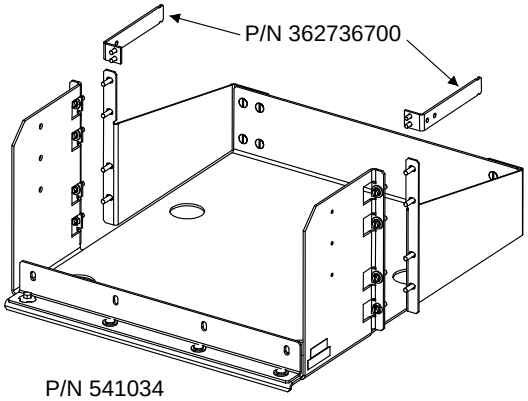
List 94: Battery Tray for 19" Relay Rack

Features

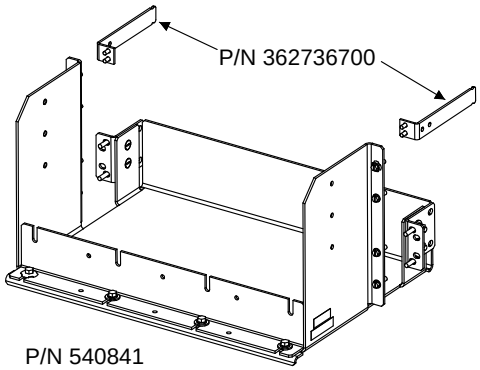
- Provides one battery tray that mounts four (4) 12V front terminal Valve Regulated Lead Acid (VRLA) batteries. Batteries are configured as one (1) 48V string.
- Accepts various VRLA batteries. See **Ordering Notes** below.
- See Overall Dimensions - 19" Battery Tray under *PHYSICAL SIZE INFORMATION* for battery tray dimensions and typical arrangement. Note that three battery trays are available to accommodate the various size batteries listed in the **Ordering Notes** tables.
- Trays can be ordered with or without battery disconnect circuit breakers. When circuit breakers are ordered, one is provided in the -48V lead of each battery string (1 circuit breaker per tray).
- Battery cables are available terminated at the power system end in an Anderson connector. Battery lugs are available for the remaining end.



P/N 541036



P/N 541034



P/N 540841

Restrictions

For 19" relay racks only.

Maximum number of List 94's per rack is three (3).

A single List 94 must mount at bottom of rack. Multiple List 94's must mount starting at bottom of rack and working upward.

Ordering Notes

1) Order multiples of List 94 for more than one (1) battery tray. See **Restrictions** above.
2) Order one (1) or more P/N 362736700 Cable Bracket(s) as required.
3) Order batteries separately. The following tables list batteries recommended for use with List 94.

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Battery Tray P/N 541036						
Manufacturer*	**Model**	**Emerson Network Power P/N**	**Rated 8-Hr. Capacity (Ah)**	**Dimension W x L x H (Inches)**	**Required Tray Spacing**	**Weight (per battery) (lbs)**
Northstar	NSB90FT	--	90	4.25 X 15.59 X 10.04	7U	70.6
Northstar	NSB100FT	--	100	4.25 X 15.59 X 11.03	7U	78.5
GNB Marathon	M12V90FT	--	90	4.13 X 15.55 X 10.63	7U	70

** See Battery Manufacturer Information located at the end of this document.*

Battery Tray P/N 541034						
Manufacturer*	**Model**	**Emerson Network Power P/N**	**Rated 8-Hr. Capacity (Ah)**	**Dimension W x L x H (Inches)**	**Required Tray Spacing**	**Weight (per battery) (lbs)**
GNB Marathon	M12V105FT	--	105	4.33 X 20.12 X 9.37	7U	79

** See Battery Manufacturer Information located at the end of this document.*

Battery Tray P/N 540841						
Manufacturer*	**Model**	**Emerson Network Power P/N**	**Rated 8-Hr. Capacity (Ah)**	**Dimension W x L x H (Inches)**	**Required Tray Spacing**	**Weight (per battery) (lbs)**
GNB Marathon	M12V35FT	--	35	4.21 X 11.02 X 7.44	6U	31
GNB Marathon	M12V50FT	--	47	4.21 X 11.02 X 9.09	7U	40
GNB Marathon	M12V60FT	--	59	4.21 X 11.02 X 10.35	7U	51
Northstar	NSB40FT**	--	38.1	3.80 X 9.80 X 8.20	6U	34
Northstar	NSB60FT**	--	57.9	4.20 X 11.30 X 10.40	7U	49
Douglas	DGS12-25F	--	25	3.94 X 10.80 X 7.60	6U	27
Douglas	DGS12-50F	--	50	3.94 X 10.80 X 11.60	8U	48

** See Battery Manufacturer Information located at the end of this document.*
*** Batteries MUST be equipped with front access terminal option. See Battery Manufacturer for ordering information.*

4) Specify rack spacing of 6U (10.5”), 7U (12.25”), or 8U (14”) between trays and above top tray as required for battery clearance. See table above.

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5) Battery lugs are provided, as specified from the following table.

Battery Specified	Battery Lug Kit Part Number (Kit provides two lugs for one tray.)	
	Lists 5 and 6	Lists 1 and 2
Northstar NSB90FT	528234	540989 (for use with 10 AWG wire and List 72) 545581 (for use with 8 AWG wire and List 71)
Northstar NSB100FT		
GNB Marathon M12V90FT		
GNB Marathon M12V105FT		
GNB Marathon M12V35FT		
GNB Marathon M12V50FT		
GNB Marathon M12V60FT		
Northstar NSB40FT		
Northstar NSB60FT		
Douglas DGS12-25F		
Douglas DGS12-50F		

6) Specify with or without battery disconnect circuit breakers. If ordering List 94 with circuit breakers, order one (1) circuit breaker per List 94 from the following table. Also specify breaker mounting on left side of tray, right side of tray, or remote mounting. **Note:** *All List 94 trays in a rack will be furnished with or without battery disconnect circuit breakers as specified for the first tray ordered.*

Also order Alarm Jumper P/N 524384 for each system to connect the alarm terminal of up to three (3) battery disconnect circuit breakers.

Ampere Rating	P/N Electrical/Mechanical Trip[1] (Black Handle)	Ampere Rating	P/N Electrical/Mechanical Trip[1] (Black Handle)
1	256690300	35	256693500
3	256690700	40	256693900
5	256691100	50	256694300
10	256691500	60	256694700
15	256691900	70	256695100
20	256692300	75	256695500
25	256692700	100	256695900
30	256693100		

Circuit Breaker Alarm Operation:
[1] Provides an alarm during an electrical or manual trip condition.

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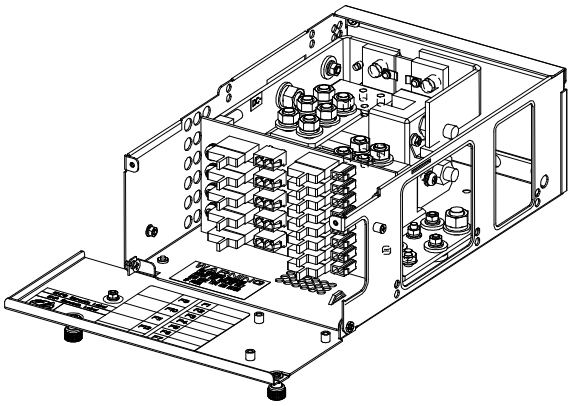
List BF: Distribution Unit with GMT Fuse Load Distribution Positions and with Low Voltage Battery Disconnect (LVBD)



Features

- Provides a Distribution Unit with Low Voltage Battery Disconnect (LVBD), a battery shunt, (3) battery connection points, and thirteen (13) GMT fuse load distribution positions.
- Five (5) 0A to 15A GMT fuse load distribution positions.
- Eight (8) 0A to 10A GMT fuse load distribution positions.

Restrictions

For use with List 5 and 6 only.

The (13) Position GMT Fuse Printed Wiring Board is rated 100A at +40°C (+104°F) and 59.5A at 65°C (+149°F).

Unless otherwise specified fuses are mounted from bottom to top, starting with the highest capacity and working to the lowest capacity.

In an ambient of 40°C (+104°F):

- Fuseholders F1-F8 are rated for a 10A fuse maximum. An empty space **is not** required between fuses of any value.
- Fuseholders F9-F13 are rated for a 15A fuse maximum. An empty space **is not** required between fuses of any value. However, 15A fuses **cannot** be placed in adjacent fuseholders. 15A fuses must be separated by a smaller fuse or a space.

In an ambient of 65°C (+149°F):

- Fuseholders F1-F8 are rated for a 10A fuse maximum. An empty space **is** required between 10A fuses. A fuse greater than 3A **cannot** be placed in a fuseholder adjacent to a 10A fuse.
- Fuseholders F9-F13 are rated for a 15A fuse maximum. An empty space **is** required between 15A fuses. 10A fuses **cannot** be placed in adjacent fuseholders. A fuse greater than 3A **cannot** be placed in a fuseholder adjacent to a 10A fuse.

See also the **Restrictions** under "GMT Load Distribution Fuses" in the ACCESSORY DESCRIPTIONS section.

Ordering Notes

1) Order one (1) Distribution Unit (List BF, LF, NF, BC, LC, NC, BA, LA, or NA) for each List 5 or 6 shelf. Also order the following as required.
2) Order Distribution Devices per ACCESSORY DESCRIPTIONS section.
3) Order one (1) List 61 for each List BF. Each List 61 provides eight (8) GMT fuse load lead assemblies for the 10A fuse blocks.
4) Order one (1) List 62 for each List BF. Each List 62 provides five (5) GMT fuse load lead assemblies for the 15A fuse blocks.
5) Order Shelf Side, Battery Side Battery Cables or Output Cables (List 65, List 66 or List 67) as required. List 65 and List 67 are factory installed.

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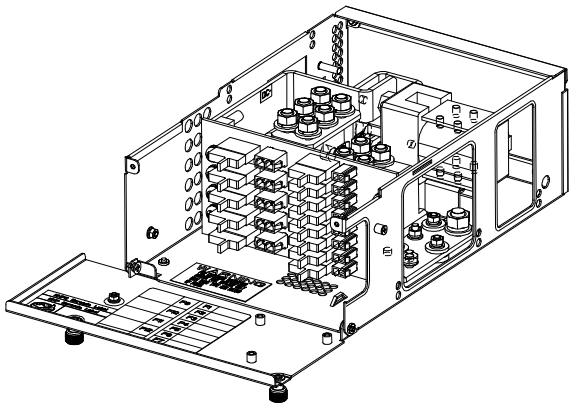
List LF: Distribution Unit with GMT Fuse Load Distribution Positions and with Low Voltage Load Disconnect (LVLD)



Features

- Provides a Distribution Unit with Low Voltage Load Disconnect (LVLD), a battery shunt, (3) battery connection points, and thirteen (13) GMT fuse load distribution positions.
- Five (5) 0A to 15A GMT fuse load distribution positions.
- Eight (8) 0A to 10A GMT fuse load distribution positions.

Restrictions

For use with List 5 and 6 only.

The (13) Position GMT Fuse Printed Wiring Board is rated 100A at +40°C (+104°F) and 59.5A at 65°C (+149°F).

Unless otherwise specified fuses are mounted from bottom to top, starting with the highest capacity and working to the lowest capacity.

In an ambient of 40°C (+104°F):

- Fuseholders F1-F8 are rated for a 10A fuse maximum. An empty space **is not** required between fuses of any value.
- Fuseholders F9-F13 are rated for a 15A fuse maximum. An empty space **is not** required between fuses of any value. However, 15A fuses **cannot** be placed in adjacent fuseholders. 15A fuses must be separated by a smaller fuse or a space.

In an ambient of 65°C (+149°F):

- Fuseholders F1-F8 are rated for a 10A fuse maximum. An empty space **is** required between 10A fuses. A fuse greater than 3A **cannot** be placed in a fuseholder adjacent to a 10A fuse.
- Fuseholders F9-F13 are rated for a 15A fuse maximum. An empty space **is** required between 15A fuses. 10A fuses **cannot** be placed in adjacent fuseholders. A fuse greater than 3A **cannot** be placed in a fuseholder adjacent to a 10A fuse.

See also the **Restrictions** under "GMT Load Distribution Fuses" in the ACCESSORY DESCRIPTIONS section.

Ordering Notes

1) Order one (1) Distribution Unit (List BF, LF, NF, BC, LC, NC, BA, LA, or NA) for each List 5 or 6 shelf. Also order the following as required.
2) Order Distribution Devices per ACCESSORY DESCRIPTIONS section.
3) Order one (1) List 61 for each List LF. Each List 61 provides eight (8) GMT fuse load lead assemblies for the 10A fuse blocks.
4) Order one (1) List 62 for each List LF. Each List 62 provides five (5) GMT fuse load lead assemblies for the 15A fuse blocks.
5) Order Shelf Side, Battery Side Battery Cables or Output Cables (List 65, List 66 or List 67) as required. List 65 and List 67 are factory installed.

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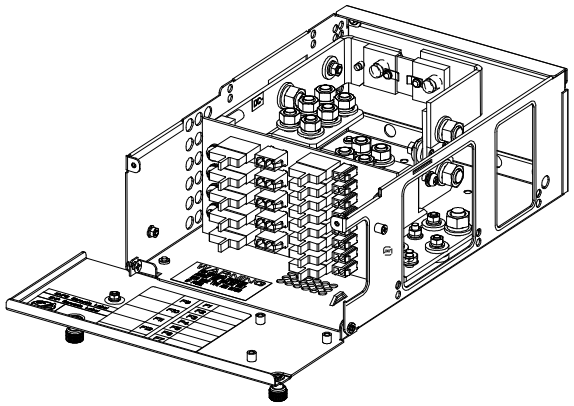
List NF: Distribution Unit with GMT Fuse Load Distribution Positions and w/out Low Voltage Disconnect



Features

- Provides a Distribution Unit w/out low voltage disconnect, a battery shunt, (3) battery connection points, and thirteen (13) GMT fuse load distribution positions.
- Five (5) 0A to 15A GMT fuse load distribution positions.
- Eight (8) 0A to 10A GMT fuse load distribution positions.

Restrictions

For use with List 5 and 6 only.

The (13) Position GMT Fuse Printed Wiring Board is rated 100A at +40°C (+104°F) and 59.5A at 65°C (+149°F).

Unless otherwise specified fuses are mounted from bottom to top, starting with the highest capacity and working to the lowest capacity.

In an ambient of 40°C (+104°F):

- Fuseholders F1-F8 are rated for a 10A fuse maximum. An empty space **is not** required between fuses of any value.
- Fuseholders F9-F13 are rated for a 15A fuse maximum. An empty space **is not** required between fuses of any value. However, 15A fuses **cannot** be placed in adjacent fuseholders. 15A fuses must be separated by a smaller fuse or a space.

In an ambient of 65°C (+149°F):

- Fuseholders F1-F8 are rated for a 10A fuse maximum. An empty space **is** required between 10A fuses. A fuse greater than 3A **cannot** be placed in a fuseholder adjacent to a 10A fuse.
- Fuseholders F9-F13 are rated for a 15A fuse maximum. An empty space **is** required between 15A fuses. 10A fuses **cannot** be placed in adjacent fuseholders. A fuse greater than 3A **cannot** be placed in a fuseholder adjacent to a 10A fuse.

See also the **Restrictions** under "GMT Load Distribution Fuses" in the ACCESSORY DESCRIPTIONS section.

Ordering Notes

1) Order one (1) Distribution Unit (List BF, LF, NF, BC, LC, NC, BA, LA, or NA) for each List 5 or 6 shelf. Also order the following as required.
2) Order Distribution Devices per ACCESSORY DESCRIPTIONS section.
3) Order one (1) List 61 for each List NF. Each List 61 provides eight (8) GMT fuse load lead assemblies for the 10A fuse blocks.
4) Order one (1) List 62 for each List NF. Each List 62 provides five (5) GMT fuse load lead assemblies for the 15A fuse blocks.
5) Order Shelf Side, Battery Side Battery Cables or Output Cables (List 65, List 66 or List 67) as required. List 65 and List 67 are factory installed.

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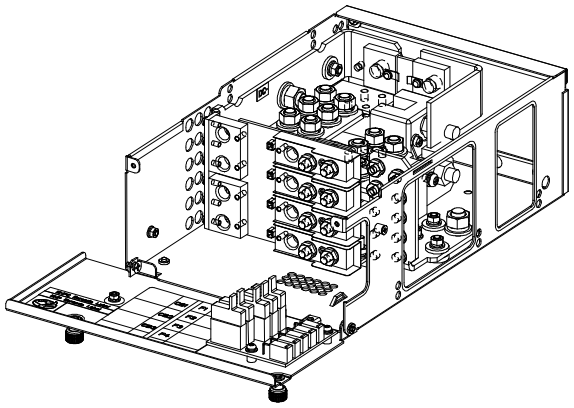
List BC: Distribution Unit with GMT Fuse Load Distribution Positions, Circuit Breaker Load Distribution Positions, and with Low Voltage Battery Disconnect (LVBD)

Features

- Provides a Distribution Unit with Low Voltage Battery Disconnect (LVBD), a battery shunt, (3) battery connection points, four (4) bullet nose-type circuit breaker load distribution positions, five (5) GMT fuse load distribution positions.
- Five (5) 0A to 10A GMT fuse load distribution positions.



Restrictions

For use with List 5 and 6 only.

Maximum distribution current is 72A at @ +65°C (+149°F) and 100A @ +40°C (+104°F).

The GMT fuse block has a 35A @ +40°C (+104°F) and a 21A @ +65°C (+149°F) maximum capacity. Maximum GMT fuse size is 10A. At +65°C (+149°F), a space is required between GMT fuses greater than 5A.

Maximum load distribution circuit breaker size is 75A @ +65°C (+149°F).

Caution: In an ambient of +65°C (+149°F), a circuit breaker with a rating greater than 45 amperes SHALL HAVE an empty mounting position between it and any other overcurrent protective device. There are no restrictions in an ambient of +40°C (+104°F).

See also the **Restrictions** under "GMT Load Distribution Fuses" and "Bullet Nose-Type Circuit Breakers" in the ACCESSORY DESCRIPTIONS section.

Ordering Notes

1) Order one (1) Distribution Unit (List BF, LF, NF, BC, LC, NC, BA, LA, or NA) for each List 5 or 6 shelf. Also order the following as required.
2) Order Distribution Devices per ACCESSORY DESCRIPTIONS section.
3) Order one (1) List 60 for each List BC. Each List 60 provides five (5) GMT fuse load lead assemblies for the 10A fuse blocks.
4) Order Shelf Side, Battery Side Battery Cables or Output Cables (List 65, List 66 or List 67) as required. List 65 and List 67 are factory installed.
5) Order circuit breaker load lugs per Wiring Notes under ACCESSORY DESCRIPTIONS section.

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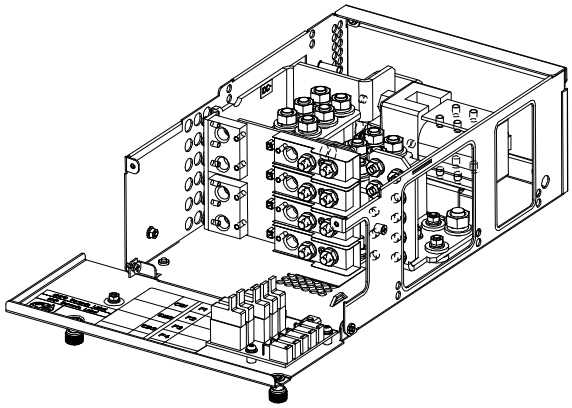
List LC: Distribution Unit with GMT Fuse Load Distribution Positions, Circuit Breaker Load Distribution Positions, and with Low Voltage Load Disconnect (LVLD)

Features



- Provides a Distribution Unit with Low Voltage Load Disconnect (LVLD), a battery shunt, (3) battery connection points, four (4) bullet nose-type circuit breaker load distribution positions, five (5) GMT fuse load distribution positions.
- Five (5) 0A to 10A GMT fuse load distribution positions.

Restrictions

For use with List 5 and 6 only.

Maximum distribution current is 72A at @ +65°C (+149°F) and 100A @ +40°C (+104°F).

The GMT fuse block has a 35A @ +40°C (+104°F) and a 21A @ +65°C (+149°F) maximum capacity. Maximum GMT fuse size is 10A. At +65°C (+149°F), a space is required between GMT fuses greater than 5A.

Maximum load distribution circuit breaker size is 75A @ +65°C (+149°F).

Caution: In an ambient of +65°C (+149°F), a circuit breaker with a rating greater than 45 amperes SHALL HAVE an empty mounting position between it and any other overcurrent protective device. There are no restrictions in an ambient of +40°C (+104°F).

See also the **Restrictions** under "GMT Load Distribution Fuses" and "Bullet Nose-Type Circuit Breakers" in the ACCESSORY DESCRIPTIONS section.

Ordering Notes

1) Order one (1) Distribution Unit (List BF, LF, NF, BC, LC, NC, BA, LA, or NA) for each List 5 or 6 shelf. Also order the following as required.
2) Order Distribution Devices per ACCESSORY DESCRIPTIONS section.
3) Order one (1) List 60 for each List LC. Each List 60 provides five (5) GMT fuse load lead assemblies for the 10A fuse blocks.
4) Order Shelf Side, Battery Side Battery Cables or Output Cables (List 65, List 66 or List 67) as required. List 65 and List 67 are factory installed.
5) Order circuit breaker load lugs per Wiring Notes under ACCESSORY DESCRIPTIONS section.

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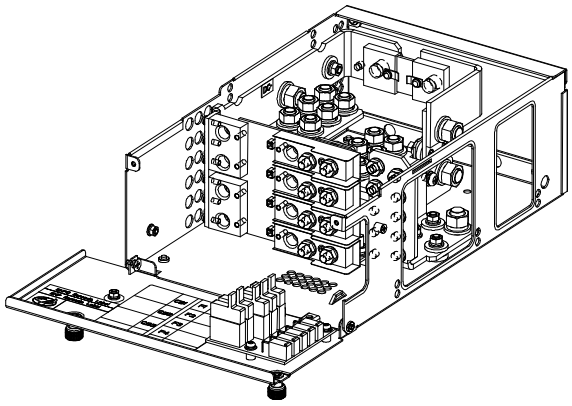
List NC: Distribution Unit with GMT Fuse Load Distribution Positions, Circuit Breaker Load Distribution Positions, and w/out Low Voltage Disconnect

Features



- Provides a Distribution Unit w/out low voltage disconnect, a battery shunt, (3) battery connection points, four (4) bullet nose-type circuit breaker load distribution positions, five (5) GMT fuse load distribution positions.
- Five (5) 0A to 10A GMT fuse load distribution positions.

Restrictions

For use with List 5 and 6 only.

Maximum distribution current is 72A at @ +65°C (+149°F) and 100A @ +40°C (+104°F).

The GMT fuse block has a 35A @ +40°C (+104°F) and a 21A @ +65°C (+149°F) maximum capacity. Maximum GMT fuse size is 10A. At +65°C (+149°F), a space is required between GMT fuses greater than 5A.

Maximum load distribution circuit breaker size is 75A @ +65°C (+149°F).

Caution: In an ambient of +65°C (+149°F), a circuit breaker with a rating greater than 45 amperes SHALL HAVE an empty mounting position between it and any other overcurrent protective device. There are no restrictions in an ambient of +40°C (+104°F).

See also the **Restrictions** under "GMT Load Distribution Fuses" and "Bullet Nose-Type Circuit Breakers" in the ACCESSORY DESCRIPTIONS section.

Ordering Notes

1) Order one (1) Distribution Unit (List BF, LF, NF, BC, LC, NC, BA, LA, or NA) for each List 5 or 6 shelf. Also order the following as required.
2) Order Distribution Devices per ACCESSORY DESCRIPTIONS section.
3) Order one (1) List 60 for each List NC. Each List 60 provides five (5) GMT fuse load lead assemblies for the 10A fuse blocks.
4) Order Shelf Side, Battery Side Battery Cables or Output Cables (List 65, List 66 or List 67) as required. List 65 and List 67 are factory installed.
5) Order circuit breaker load lugs per Wiring Notes under ACCESSORY DESCRIPTIONS section.

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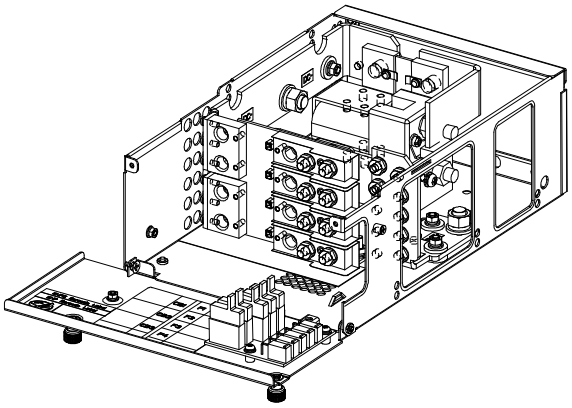
List BA: Distribution Unit with GMT Fuse Load Distribution Positions, Circuit Breaker Load Distribution Positions, Circuit Breaker Battery Disconnect Positions, and with Low Voltage Battery Disconnect (LVBD)

Features

- Provides a Distribution Unit with Low Voltage Battery Disconnect (LVBD), a battery shunt, two (2) bullet nose-type circuit breaker load distribution positions, two (2) bullet nose-type circuit breaker battery disconnect positions, five (5) GMT fuse load distribution positions.
- Five (5) 0A to 10A GMT fuse load distribution positions.



Restrictions

For use with List 5 and 6 only.

Maximum distribution current is 72A at @ +65°C (+149°F) and 100A @ +40°C (+104°F).

The GMT fuse block has a 35A @ +40°C (+104°F) and a 21A @ +65°C (+149°F) maximum capacity. Maximum GMT fuse size is 10A. At +65°C (+149°F), a space is required between GMT fuses greater than 5A.

Maximum load distribution or battery circuit breaker size is 75A @ +65°C (+149°F).

Caution: In an ambient of +65°C (+149°F), a circuit breaker with a rating greater than 45 amperes SHALL HAVE an empty mounting position between it and any other overcurrent protective device. There are no restrictions in an ambient of +40°C (+104°F).

See also the **Restrictions** under "GMT Load Distribution Fuses" and "Bullet Nose-Type Circuit Breakers" in the ACCESSORY DESCRIPTIONS section.

Ordering Notes

1) Order one (1) Distribution Unit (List BF, LF, NF, BC, LC, NC, BA, LA, or NA) for each List 5 or 6 shelf. Also order the following as required.
2) Order Distribution Devices per ACCESSORY DESCRIPTIONS section.
3) Order one (1) List 60 for each List BA. Each List 60 provides five (5) GMT fuse load lead assemblies for the 10A fuse blocks.
4) Order circuit breaker load lugs and battery input lugs per Wiring Notes under ACCESSORY DESCRIPTIONS section.

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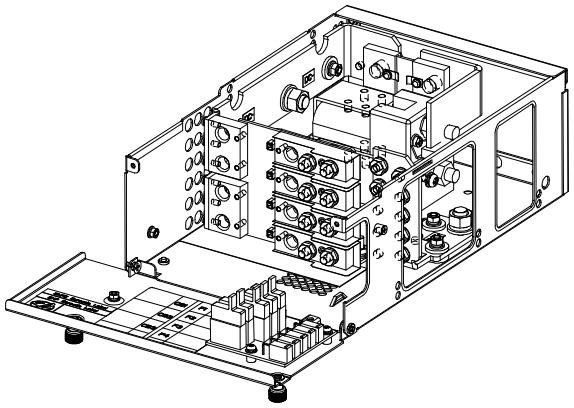
List LA: Distribution Unit with GMT Fuse Load Distribution Positions, Circuit Breaker Load Distribution Positions, Circuit Breaker Battery Disconnect Positions, and with Low Voltage Load Disconnect (LVLD)

Features



- Provides a Distribution Unit with Low Voltage Load Disconnect (LVLD), a battery shunt, two (2) bullet nose-type circuit breaker load distribution positions, two (2) bullet nose-type circuit breaker battery disconnect positions, five (5) GMT fuse load distribution positions.
- Five (5) 0A to 10A GMT fuse load distribution positions.

Restrictions

For use with List 5 and 6 only.

Maximum distribution current is 72A at @ +65°C (+149°F) and 100A @ +40°C (+104°F).

The GMT fuse block has a 35A @ +40°C (+104°F) and a 21A @ +65°C (+149°F) maximum capacity. Maximum GMT fuse size is 10A. At +65°C (+149°F), a space is required between GMT fuses greater than 5A.

Maximum load distribution or battery circuit breaker size is 75A @ +65°C (+149°F).

Caution: In an ambient of +65°C (+149°F), a circuit breaker with a rating greater than 45 amperes SHALL HAVE an empty mounting position between it and any other overcurrent protective device. There are no restrictions in an ambient of +40°C (+104°F).

See also the **Restrictions** under "GMT Load Distribution Fuses" and "Bullet Nose-Type Circuit Breakers" in the ACCESSORY DESCRIPTIONS section.

Ordering Notes

1) Order one (1) Distribution Unit (List BF, LF, NF, BC, LC, NC, BA, LA, or NA) for each List 5 or 6 shelf. Also order the following as required.
2) Order Distribution Devices per ACCESSORY DESCRIPTIONS section.
3) Order one (1) List 60 for each List LA. Each List 60 provides five (5) GMT fuse load lead assemblies for the 10A fuse blocks.
4) Order circuit breaker load lugs and battery input lugs per Wiring Notes under ACCESSORY DESCRIPTIONS section.

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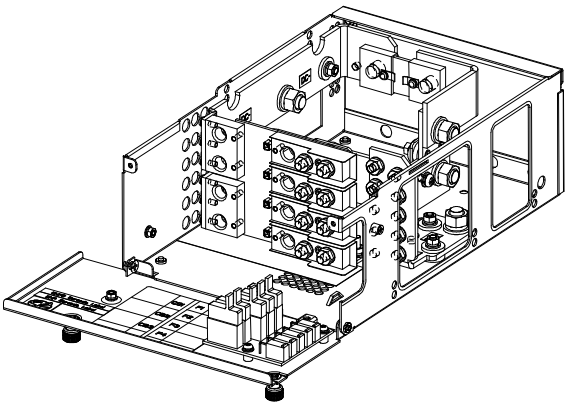
List NA: Distribution Unit with GMT Fuse Load Distribution Positions, Circuit Breaker Load Distribution Positions, Circuit Breaker Battery Disconnect Positions, and w/out Low Voltage Disconnect

Features



- Provides a Distribution Unit w/out low voltage disconnect, a battery shunt, two (2) bullet nose-type circuit breaker load distribution positions, two (2) bullet nose-type circuit breaker battery disconnect positions, five (5) GMT fuse load distribution positions.
- Five (5) 0A to 10A GMT fuse load distribution positions.

Restrictions

For use with List 5 and 6 only.

Maximum distribution current is 72A at @ +65°C (+149°F) and 100A @ +40°C (+104°F).

The GMT fuse block has a 35A @ +40°C (+104°F) and a 21A @ +65°C (+149°F) maximum capacity. Maximum GMT fuse size is 10A. At +65°C (+149°F), a space is required between GMT fuses greater than 5A.

Maximum load distribution or battery circuit breaker size is 75A @ +65°C (+149°F).

Caution: In an ambient of +65°C (+149°F), a circuit breaker with a rating greater than 45 amperes SHALL HAVE an empty mounting position between it and any other overcurrent protective device. There are no restrictions in an ambient of +40°C (+104°F).

See also the **Restrictions** under "GMT Load Distribution Fuses" and "Bullet Nose-Type Circuit Breakers" in the ACCESSORY DESCRIPTIONS section.

Ordering Notes

1) Order one (1) Distribution Unit (List BF, LF, NF, BC, LC, NC, BA, LA, or NA) for each List 5 or 6 shelf. Also order the following as required.
2) Order Distribution Devices per ACCESSORY DESCRIPTIONS section.
3) Order one (1) List 60 for each List NA. Each List 60 provides five (5) GMT fuse load lead assemblies for the 10A fuse blocks.
4) Order circuit breaker load lugs and battery input lugs per Wiring Notes under ACCESSORY DESCRIPTIONS section.

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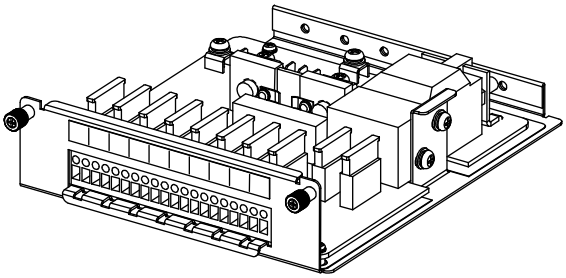
List BG: Distribution Unit with GMT Fuse Load Distribution Positions and with Low Voltage Battery Disconnect (LVBD)

Features



- Provides a Distribution Unit with Low Voltage Battery Disconnect (LVBD), battery cables, and ten (10) GMT fuse load distribution positions (15A maximum).
- Two (2) 8 AWG 48" long battery cables are factory connected inside the shelf. These cables are terminated at the customer end in a Red SB50 Anderson battery connector. A mating Anderson battery connector is provided [Housing: Emerson P/N 138922, Anderson Power Products P/N 992G1. Contacts (two provided): Emerson P/N 247109602, Anderson Power Products P/N 5952].
- Ten (10) 0A to 15A GMT fuse load distribution positions.

Restrictions

For use with List 1 and 2 only.

The Distribution Unit has a 50A @ +40°C (+104°F) and 40A @ +65°C (+149°F) maximum capacity. Maximum GMT fuse size is 15A. In an ambient of +65°C (+149°F), an empty space is required between 15A fuses.

See also the **Restrictions** under "GMT Load Distribution Fuses" in the ACCESSORY DESCRIPTIONS section.

Ordering Notes

1) Order one (1) Distribution Unit (List BG or NG) for each List 1 or 2 shelf.
   Also order the following as required.
2) Order Distribution Devices per ACCESSORY DESCRIPTIONS section.
3) Order Optional External Battery Cables with Anderson Connector for one (1) to two (2) Battery Strings per List 71 or 72.
4) Order Spare Anderson Battery Connector per ACCESSORY DESCRIPTIONS section.

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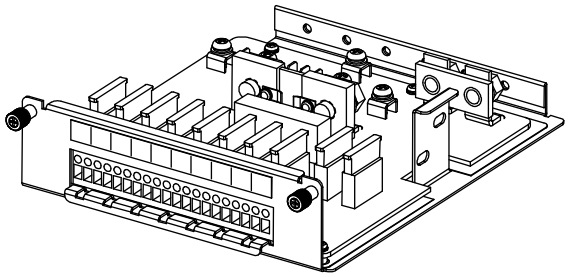
List NG: Distribution Unit with GMT Fuse Load Distribution Positions and w/out Low Voltage Disconnect

Features



- Provides a Distribution Unit w/out low voltage disconnect, a battery shunt, battery cables, and ten (10) GMT fuse load distribution positions (15A maximum).
- Two (2) 8 AWG 48" long battery cables are factory connected inside the shelf. These cables are terminated at the customer end in a Red SB50 Anderson battery connector. A mating Anderson battery connector is provided [Housing: Emerson P/N 138922, Anderson Power Products P/N 992G1. Contacts (two provided): Emerson P/N 247109602, Anderson Power Products P/N 5952].
- Ten (10) 0A to 15A GMT fuse load distribution positions.

Restrictions

For use with List 1 and 2 only.

The Distribution Unit has a 50A @ +40°C (+104°F) and 40A @ +65°C (+149°F) maximum capacity. Maximum GMT fuse size is 15A. In an ambient of +65°C (+149°F), an empty space is required between 15A fuses.

See also the **Restrictions** under "GMT Load Distribution Fuses" in the ACCESSORY DESCRIPTIONS section.

Ordering Notes

1) Order one (1) Distribution Unit (List BG or NG) for each List 1 or 2 shelf.
   Also order the following as required.
2) Order Distribution Devices per ACCESSORY DESCRIPTIONS section.
3) Order Optional External Battery Cables with Anderson Connector for one (1) to two (2) Battery Strings per List 71 or 72.
4) Order Spare Anderson Battery Connector per ACCESSORY DESCRIPTIONS section.

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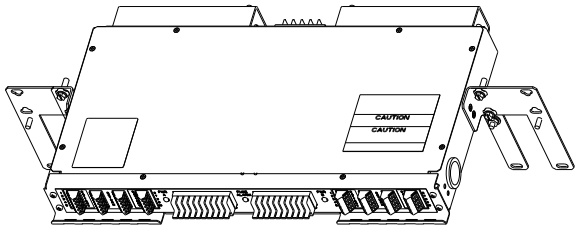
List KG: Distribution Panel with (20) GMT Fuse Load Distribution Positions

Features



- 1U-high GMT fuse panel that provides Single Load Distribution (-48V)
- Provides twenty (20) 0A to 15A GMT fuse load distribution positions.
- Maximum Capacity: 80A @ +40°C and 80A @ +65°C
- Factory mounted and connected to List 5 or 6 shelf.
- If the Distribution Unit in the system is equipped with Low Voltage Load Disconnect (LVLD), all List KG loads are disconnected.
- If one or more distribution fuses opens, one set of Form-C relay contacts changes state, and resistive battery is provided to an alarm terminal. Alarm circuit is factory connected to activate the Power System Controller fuse alarm

Restrictions

For use with List 5 and 6 only.

Mounts only immediately above List 5 or 6 shelf.

Maximum distribution current is 80A.

See also the **Restrictions** under "GMT Load Distribution Fuses" in the ACCESSORY DESCRIPTIONS section.

Ordering Notes

1) Order one (1) List KG GMT Distribution Fuse Panel Assembly for each List 5 or 6 shelf as required. Also order the following as required.
2) Order GMT Load Distribution Fuses per ACCESSORY DESCRIPTIONS section.

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ACCESSORY DESCRIPTIONS

Relay Racks

Features

- The following relay racks are available.

Restrictions

Customer must mount Power/Distribution Shelf in relay rack. If battery trays are ordered, they are factory mounted in the relay rack.

Ordering Notes

1) Order from relay racks listed in Table 1.

Part Number	Size	Available Mounting Positions (1RU = 1-3/4")	Notes
23" Relay Racks			
543156	51-3/8" H x 23" W	28RU	Welded
543161	6'0" H x 23" W	37RU	Welded
543160	7'0" H x 23" W	45RU	Seismic (Note 1)
543162	7'0" H x 23" W	45RU	Welded
543163	7'6" H x 23" W	48RU	Welded
543164	8'0" H x 23" W	51RU	Welded
19" Relay Racks			
525003	51-3/8" H x 19" W	28RU	Welded
534653	6'0" H x 19" W	37RU	Seismic (Note 1)
524961	6'0" H x 19" W	37RU	Welded
534654	6'6" H x 19" W	41RU	Seismic (Note 1)
534651	6'6" H x 19" W	41RU	Welded
528183	7'0" H x 19" W	45RU	Seismic (Note 1)
524988	7'0" H x 19"W	45RU	Welded
524963	7'6" H x 19" W	48RU	Welded
534652	8'0" H x 19" W	51RU	Welded

Note 1: *Complies with Bellcore Seismic Zone 4 requirements.*

Table 1
Available Relay Racks

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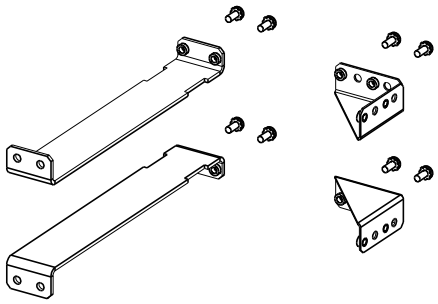
Mounting and Adapter Kits

Optional Wall Mount Bracket Kit for Lists 1 and 2, P/N 541285



Features

- Allows for horizontal or vertical wall mounting.

Restrictions

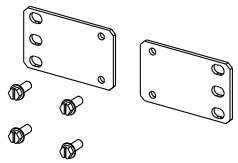
For use with List 1 or 2 only.

Customer must supply mounting fasteners for attaching the Wall Mount Bracket to the wall.

Ordering Notes

1) Order P/N 541285, which consists of two (2) P/N 545701 horizontal wall mounting brackets and two (2) P/N 541284 vertical wall mounting brackets, and eight (8) 12-24 x ½" screws for attaching the brackets to the shelf.

Optional 19" to 23" Rack Adapter Kit, P/N 540993



Features

- Allows for 23" relay rack mounting

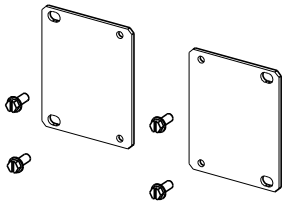
Restrictions

For use with List 1 only.

Ordering Notes

1) Order P/N 540993, which consists of two (2) P/N 540994 adapters and four (4) 12-24 x 1/"2 thread forming screws.

Optional 19" to 23" Rack Adapter Kit, P/N 545728



Features

- Allows for 23" relay rack mounting

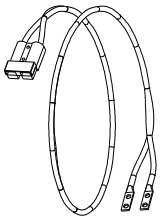
Restrictions

For use with List 5 only.

Ordering Notes

1) Order P/N 545728, which consists of two (2) P/N 545727 adapters and four (4) 12-24 x 1/"2 thread forming screws.

Rear Battery Cable Exit Kit P/N 547645



Features

- Provides 12" battery cables exiting rear of shelf

Restrictions

For use with List 5 only.

Ordering Notes

1) For use with Battery Cabinets only.

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Distribution Devices

GMT Load Distribution Fuses

Features

- Each List BF, LF, NF Distribution Unit holds up to five (5) 0-15A GMT load distribution fuses and eight (8) 0-10A GMT load distribution fuses.
- Each List BC, LC, NC, BA, LA, NA Distribution Unit holds up to five (5) 0-10A GMT load distribution fuses.
- Each List BG and NG Distribution Unit holds up to ten (10) 0-15A GMT load distribution fuses.
- Each List KG Distribution Panel holds up to twenty (20) 0-15A GMT load distribution fuses.

Restrictions

When used for power distribution, load should not exceed 80% of device rating, except 10 and 15 ampere fuses, for which load should not exceed 70% of device rating.

See also the **Restrictions** for each Distribution Unit in the LIST DESCRIPTIONS section.

See also Load Distribution Wiring (GMT Fuses) (Lists BG and NG only), Load Distribution Wiring (GMT Fuses) (Lists BF, LF, and NF only), and Load Distribution Wiring (GMT Fuses) (Lists BC, LC, NC, BA, LA, and NA) under WIRING NOTES for additional wiring restrictions.

Ordering Notes

1) Order GMT fuses per Table 2.

Ampere Rating		P/N	Fuse Color
18/100 GMT-A		248610301	--
1/4		248610200	Violet
1/2		248610300	Red
3/4		248610500	Brown
1-1/3		248610700	White
2		248610800	Orange
3		248610900	Blue
5		248611000	Green
7-1/2		248611300	Black-White
10		248611200	Red-White
15		248611500	Red-Blue
Replacement Dummy Fuse		248872600	---
Replacement Safety Fuse Cover	Lists BF, LF, NF, BC, LC, NC, BA, LA, NA and KG	102774	--
	Lists BG and NG	248898700	

Table 2
GMT Fuses

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Bullet Nose-Type Circuit Breakers

Features

- Each List BC, LC, and NC Distribution Unit holds up to four (4) bullet nose-type load distribution circuit breakers.
- Each List BA, LA, and NA Distribution Unit holds up to two (2) bullet nose-type battery disconnect circuit breakers and up to two (2) bullet nose-type load distribution circuit breakers.

Restrictions

See also the **Restrictions** for each Distribution Unit in the LIST DESCRIPTIONS section.

See also Load Distribution Wiring (Circuit Breakers) (Lists BC, LC, NC, BA, LA, and NA) and Input Battery Wiring (to Battery Disconnect Circuit Breakers) (Lists BA, LA, and NA) under WIRING NOTES for additional wiring restrictions.

Ordering Notes

1) Order circuit breakers per Table 3.

Ampere Rating	P/N	
	Electrical Trip[1] (White Handle)	Electrical/ Mechanical Trip[2] (Black Handle)
1	102272	101596
3	102273	101597
5	102274	101598
10	102275	101599
15	102276	101600
20	102277	101601
25	102278	101602
30	102279	101603
35	102280	101604
40	102281	101605
45	121998	121997
50	102282	101606
60	102283	101607
70	102284	101608
75	102285	101609
80	121996	121995
100	102286	101610
See Table 6 for recommended wire sizes and lugs.		

Circuit Breaker Alarm Operation:
[1] Provides an alarm during an electrical trip condition only.
[2] Provides an alarm during an electrical or manual trip condition.

Note that Electrical Trip only circuit breakers are not typically used for battery disconnect circuit breakers.

Table 3
Bullet Nose-Type Circuit Breakers

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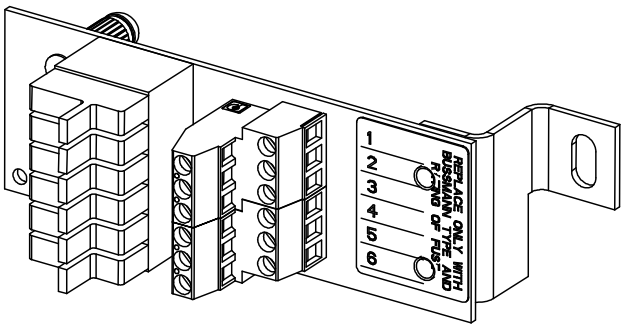
Optional Bullet Nose 6-Position GMT Fuse Module, P/N 545332

Features

- Factory installed in a List BC, LC, NC, BA, LA, and NA Distribution Unit.
- Provides six (6) 0A to 15A GMT fuse load distribution positions.
- Screw clamp type load and load return terminals provided.
- Includes six (6) dummy fuses equipped with safety fuse covers.



Restrictions

For use with Lists BC, LC, NC, BA, LA, and NA.

Terminal block wire size capacity: 24 to 14 AWG.

Requires two (2) bullet device mounting positions.

Fuse Module has a 30A @ +40°C (+104°F) and +65°C (+149°F) maximum capacity. Maximum GMT fuse size is 15A. Fuses are to be loaded from bottom to top with highest value in the lowest position.

Caution: A fuse with a rating greater than 10 amperes SHALL HAVE an empty mounting position between it and any other overcurrent protective device.

See also the **Restrictions** under "GMT Load Distribution Fuses" in the ACCESSORY DESCRIPTIONS section.

Factory installed only.

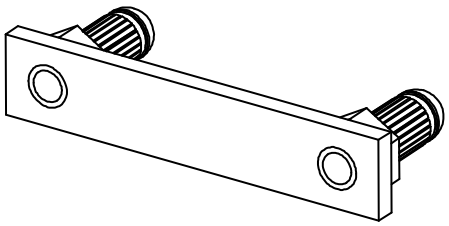
Ordering Notes

1) Order optional Bullet Nose-Type 6-Position GMT Fuse Module (P/N 545332) as required.
2) Order GMT fuses as required per Table 2.

Optional Bulk Output Busbar, P/N 535015

Features

- Each Bulk Output Busbar installs in a single circuit breaker position in a List BC, LC, NC, BA, LA, and NA Distribution Unit.



Restrictions

For use with Lists BC, LC, NC, BA, LA, and NA.

Ordering Notes

3) Order by P/N 535015 as required.

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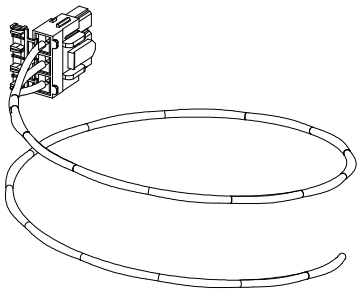
AC Input Cables and Line Cords

AC Input Cable Assembly, P/N 535232

Features



- Provides one (1) 30” long, 8 AWG, AC Input Cable Assembly;
  - terminated on one end with a Molex plug which mates with AC input receptacle on the Power/Distribution Shelf,
  - and the remaining end un-terminated.

Restrictions

Rated for 30A.

For use with List 1, 2, 5, and 6.

Each List 1 and 2 requires one (1) AC Input Cable Assembly/Line Cord.

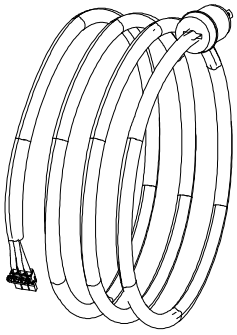
Each List 5 and 6 requires two (2) AC Input Cable Assemblies/Line Cords.

Ordering Notes

1) Order one (1) AC Input Cable Assembly/Line Cord as required for each List 1 and 2 ordered.
2) Order two (2) AC Input Cable Assemblies/Line Cords as required for each List 5 and 6 ordered.

AC Input Line Cord, 208/240VAC, P/N 540946

Features



- Provides one (1) 14’ long, 8 AWG, AC Input Line Cord;
  - terminated on one end with a Molex plug which mates with AC input receptacle on the Power/Distribution Shelf,
  - and on the remaining end with a NEMA L6-30P twist-lock plug.

Restrictions

For 208/240 VAC only (rated for 30A at 208/240VAC).

For use with List 1, 2, 5, and 6.

Each List 1 and 2 requires one (1) AC Input Cable Assembly/Line Cord.

Each List 5 and 6 requires two (2) AC Input Cable Assemblies/Line Cords.

Ordering Notes

1) Order one (1) AC Input Cable Assembly/Line Cord as required for each List 1 and 2 ordered.
2) Order two (2) AC Input Cable Assemblies/Line Cords as required for each List 5 and 6 ordered.

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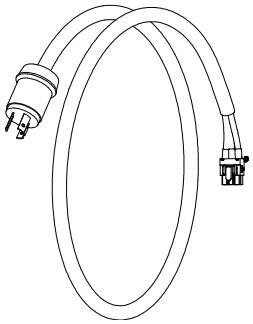
AC Input Line Cord, 208/240VAC, P/N 545616

Features

- Provides one (1) 6' long, 8 AWG, AC Input Line Cord;
  - terminated on one end with a Molex plug which mates with AC input receptacle on the Power/Distribution Shelf,
  - and on the remaining end with a NEMA L6-30P twist-lock plug.



Restrictions

For 208/240 VAC only (rated for 30A at 208/240VAC).

For use with List 1, 2, 5, and 6.

Each List 1 and 2 requires one (1) AC Input Cable Assembly/Line Cord.

Each List 5 and 6 requires two (2) AC Input Cable Assemblies/Line Cords.

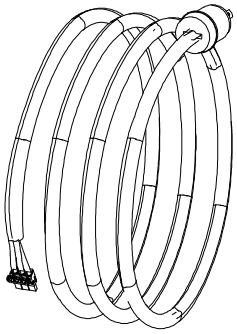
Ordering Notes

1) Order one (1) AC Input Cable Assembly/Line Cord as required for each List 1 and 2 ordered.
2) Order two (2) AC Input Cable Assemblies/Line Cords as required for each List 5 and 6 ordered.

AC Input Line Cord, 120VAC, P/N 545252

Features

- Provides one (1) 14' long, 8 AWG, AC Input Line Cord;
  - terminated on one end with a Molex plug which mates with AC input receptacle on the Power/Distribution Shelf,
  - and on the remaining end with a NEMA L5-30P twist-lock plug.



Restrictions

For 120 VAC only (rated for 30A at 120VAC).

For use with List 1, 2, 5, and 6.

Each List 1 and 2 requires one (1) AC Input Cable Assembly/Line Cord.

Each List 5 and 6 requires two (2) AC Input Cable Assemblies/Line Cords.

Ordering Notes

1) Order one (1) AC Input Cable Assembly/Line Cord as required for each List 1 and 2 ordered.
2) Order two (2) AC Input Cable Assemblies/Line Cords as required for each List 5 and 6 ordered.

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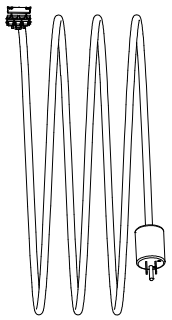
AC Input Line Cord, 120VAC, P/N 545478

Features



- Provides one (1) 14' long, 14/3 AWG, AC Input Line Cord;
  - terminated on one end with a Molex plug which mates with AC input receptacle on the Power/Distribution Shelf,
  - and on the remaining end with a NEMA 5-15P plug.

Restrictions

For 120 VAC only (rated for 15A at 120VAC).

For use with List 1 and 5 equipped with R48-500 Rectifier Modules.

Each List 1 requires one (1) AC Input Cable Assembly/Line Cord.

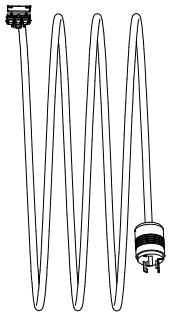
Each List 5 requires two (2) AC Input Cable Assemblies/Line Cords.

Ordering Notes

1) Order one (1) AC Input Cable Assembly/Line Cord as required for each List 1 ordered.
2) Order two (2) AC Input Cable Assemblies/Line Cords as required for each List 5 ordered.

AC Input Line Cord, 120VAC, P/N 545479

Features



- Provides one (1) 14' long, 14/3 AWG, AC Input Line Cord;
  - terminated on one end with a Molex plug which mates with AC input receptacle on the Power/Distribution Shelf,
  - and on the remaining end with a NEMA L5-15P twist-lock plug.

Restrictions

For 120 VAC only (rated for 15A at 120VAC).

For use with List 1 and 5 equipped with R48-500 Rectifier Modules.

Each List 1 requires one (1) AC Input Cable Assembly/Line Cord.

Each List 5 requires two (2) AC Input Cable Assemblies/Line Cords.

Ordering Notes

1) Order one (1) AC Input Cable Assembly/Line Cord as required for each List 1 ordered.
2) Order two (2) AC Input Cable Assemblies/Line Cords as required for each List 5 ordered.

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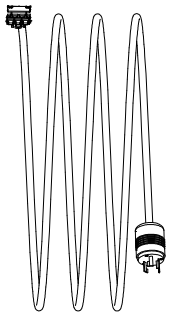
AC Input Line Cord, 208/240VAC, P/N 545480

Features



- Provides one (1) 14' long, 14/3 AWG, AC Input Line Cord;
  - terminated on one end with a Molex plug which mates with AC input receptacle on the Power/Distribution Shelf,
  - and on the remaining end with a NEMA L6-15P twist-lock plug.

Restrictions

For 240 VAC only (rated for 15A at 208/240VAC).

For use with List 1 and 5.

For use with List 2 and 6 with R48-500 Rectifiers.

Each List 1 and 2 requires one (1) AC Input Cable Assembly/Line Cord.

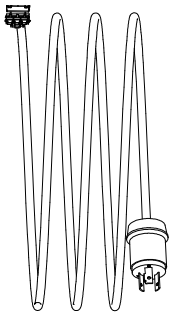
Each List 5 and 6 requires two (2) AC Input Cable Assemblies/Line Cords.

Ordering Notes

1) Order one (1) AC Input Cable Assembly/Line Cord as required for each List 1 ordered.
2) Order two (2) AC Input Cable Assemblies/Line Cords as required for each List 5 ordered.

AC Input Line Cord, 120VAC, P/N 545481

Features



- Provides one (1) 14' long, 12/3 AWG, AC Input Line Cord;
  - terminated on one end with a Molex plug which mates with AC input receptacle on the Power/Distribution Shelf,
  - and on the remaining end with a NEMA L5-20P twist-lock plug.

Restrictions

For 120 VAC only (rated for 20A at 120VAC).

For use with List 1 and 5.

For use with List 2 and 6 with R48-500 Rectifiers.

Each List 1 and 2 requires one (1) AC Input Cable Assembly/Line Cord.

Each List 5 and 6 requires two (2) AC Input Cable Assemblies/Line Cords.

Ordering Notes

1) Order one (1) AC Input Cable Assembly/Line Cord as required for each List 1 ordered.
2) Order two (2) AC Input Cable Assemblies/Line Cords as required for each List 5 ordered.

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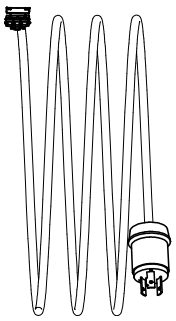
AC Input Line Cord, 208/240VAC, P/N 545553

Features



- Provides one (1) 14' long, 12/3 AWG, AC Input Line Cord;
  - terminated on one end with a Molex plug which mates with AC input receptacle on the Power/Distribution Shelf,
  - and on the remaining end with a NEMA L6-20P twist-lock plug.

Restrictions

For 240 VAC only (rated for 20A at 208/240VAC).

For use with List 1, 2, 5, and 6.

Each List 1 and 2 requires one (1) AC Input Cable Assembly/Line Cord.

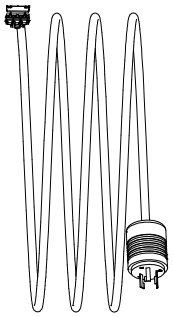
Each List 5 and 6 requires two (2) AC Input Cable Assemblies/Line Cords.

Ordering Notes

1) Order one (1) AC Input Cable Assembly/Line Cord as required for each List 1 and 2 ordered.
2) Order two (2) AC Input Cable Assemblies/Line Cords as required for each List 5 and 6 ordered.

AC Input Line Cord, 120VAC, P/N 547525

Features



- Provides one (1) 14' long, 12/3 AWG, AC Input Line Cord;
  - terminated on one end with a Molex plug which mates with AC input receptacle on the Power/Distribution Shelf,
  - and on the remaining end with a NEMA L5-30P twist-lock plug.

Restrictions

For 120 VAC only (rated for 30A at 120VAC).

For use with List 1, 2, 5, and 6.

Each List 1 and 2 requires one (1) AC Input Cable Assembly/Line Cord.

Each List 5 and 6 requires two (2) AC Input Cable Assemblies/Line Cords.

Ordering Notes

1) Order one (1) AC Input Cable Assembly/Line Cord as required for each List 1 and 2 ordered.
2) Order two (2) AC Input Cable Assemblies/Line Cords as required for each List 5 and 6 ordered.

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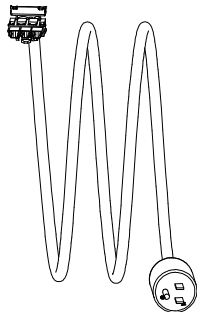
AC Input Line Cord, 120VAC, P/N 548457

Features



- Provides one (1) 6' long, 14/3 AWG, AC Input Line Cord;
  - terminated on one end with a Molex plug which mates with AC input receptacle on the Power/Distribution Shelf,
  - and on the remaining end with a NEMA 5-15P plug.

Restrictions

For 120 VAC only (rated for 15A at 120VAC).

For use with List 1 and 5 with R48-500 Rectifiers.

Each List 1 requires one (1) AC Input Cable Assembly/Line Cord.

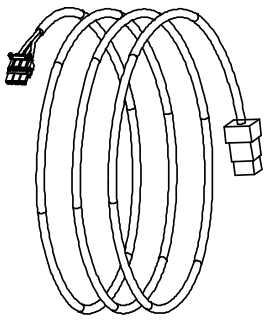
Each List 5 requires two (2) AC Input Cable Assemblies/Line Cords.

Ordering Notes

1) Order one (1) AC Input Cable Assembly/Line Cord as required for each List 1 ordered.
2) Order two (2) AC Input Cable Assemblies/Line Cords as required for each List 5 ordered.

AC Input Line Cord, 120/208/240VAC, P/N 548196

Features



- Provides one (1) 6' long, 12/3 AWG, AC Input Line Cord;
  - terminated on one end with a Molex plug which mates with AC input receptacle on the Power/Distribution Shelf,
  - and on the remaining end with an IEC320 C20 plug.

Restrictions

For 120/208/240 VAC (rated for 20A at 120/208/240VAC).

For 208/240V use with List 1, 2, 5, and 6 and all Rectifier Modules.

For 120V use with List 1 and 5 and all Rectifier Modules.

For 120V use with List 2 and 6 with 500W Rectifier Module only.

Each List 1 and 2 requires one (1) AC Input Cable Assembly/Line Cord.

Each List 5 and 6 requires two (2) AC Input Cable Assemblies/Line Cords.

Per UL 60950-1, 2nd Edition, when this cord is used with this power system, the following restrictions apply:

- The power system must be used "in a location having equipotential bonding (such as a telecommunications centre, a dedicated computer room or a restricted access location).
- "The building installation shall provide a means for connection to protective earth; and
- "The equipment is to be connected to that means; and
- "A service person shall check whether or not the socket-outlet from which the equipment is to be powered provides a connection to the building protective earth. If not, the service person shall arrange for the installation of a protective earthing conductor from the separated protective earthing terminal to the protective earth wire in the building."

Ordering Notes

1) Order one (1) AC Input Cable Assembly/Line Cord as required for each List 1 and 2 ordered.

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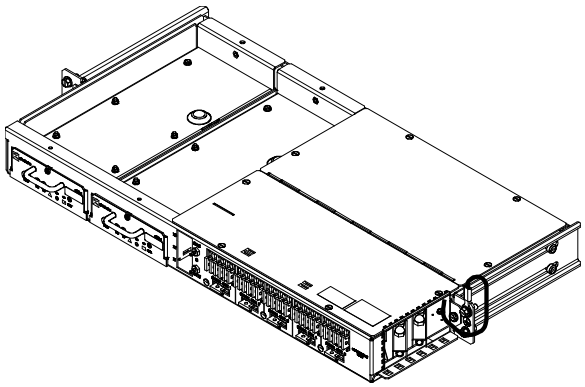
2) Order two (2) AC Input Cable Assemblies/Line Cords as required for each List 5 and 6 ordered.

AP6C57EA/EB Ring & Distribution Module

Features



- When used with List 6, this module is designed to supply a filtered and regulated –48 VDC source and a continuous 20 Hz ringing supply source to imbedded subscriber loop carrier telecommunication systems (such as SLC-96 or SLC Series-5) requiring up to 45 A of load capacity.
- Designed to mount in a 23" relay rack, the module is one rack unit high, with 5" front projection.
- Includes two (2) 50VA ringers with automatic transfer capability (N+1 redundancy).
- Provides 35 DC distribution fuse positions, configured in five groups of seven, feeding five channel banks. Includes 35 dummy fuses.
- Connectorized cables are available for SLC-96 or SLC Series-5 applications. Required DC distribution fuses are included with each cable assembly ordered.
- An Order Wire Option provides a connection interface for an analog communication link over a metallic pair, with surge protection.
- See Ring & Distribution Module Installation and User Manuals (IM6C57E and UM6C57E) for complete specifications.

Restrictions

Cannot be used with Distribution units List BF, LF, or NF.

Ordering Notes

1) For a Ring & Distribution Module equipped with two (2) 50VA ringers only, order AP6C57EA (A7000626).
2) For a Ring & Distribution Module equipped with two (2) 50VA ringers and the Order Wire option, order AP6C57EB (A7000796).
3) Order distribution cable assemblies as required, from the following table. Order up to five (5) cable assemblies (one per channel bank). Required fuses are included with each cable assembly. Cable assemblies can be mixed.

ORDERING CODE	DESCRIPTION
P7000858	Cable assy for one SLC96 channel bank (8 ft.)
P7001139	Cable assy for one SLC96 channel bank (20 ft.)
P7000859	Cable assy for one SLC5 channel bank (8 ft.)
P7001136	Cable assy for one SLC5 channel bank (20 ft.)
P7000937*	Cable assy for one channel bank, generic applications (8 ft.)

*Note: Each channel bank position on the panel has a maximum capacity of 11A.

4) Order Part No. 547491 DC power cable kit, as required. Provides two (2) 9" long cables to connect between a power shelf and the DC input terminals of one (1) Ring & Distribution Module.

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5) For SLC-96 or SLC Series-5 applications, order battery cable kits as required, from the following table.

ORDERING CODE	DESCRIPTION
547646	Battery cable kit for SLC96 legacy power shelf (Tyco Mate-N-Lock connectors) - for 2 battery strings, Up to 3 cable kits can be installed in the power shelf with Distribution units BC, LC, and NC. Two cable kits can be installed in DU Lists BA, LA, and NA. (Use a flat washer, not provided.)
547647	Battery cable for SLC5 legacy power shelf (Tyco Mate-N-Lock connectors) - for 2 battery strings, Up to 3 cable kits can be installed in the power shelf with Distribution units BC, LC, and NC. Two cable kits can be installed in DU Lists BA, LA, and NA. (Use a flat washer, not provided.)

6) Spare parts for the AP6C57EA/EB Ring & Distribution Module can be ordered as required from the following table.

ORDERING CODE	DESCRIPTION
A0885525	1.33A Alarm SAN-O Fuse
A0885530	3A Alarm SAN-O Fuse
A0885531	5A Alarm SAN-O Fuse
A0885532	10A Alarm SAN-O Fuse
A7000627 (AP8C55AA)	50VA Ring Generator

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External Battery Disconnect Unit, P/N 535282

Features

- Battery Disconnect Unit with mounting tabs.
- Two 1/4-20 studs w/hardware provided for installation of single hole battery lugs.
- One (10' long) alarm lead provided.

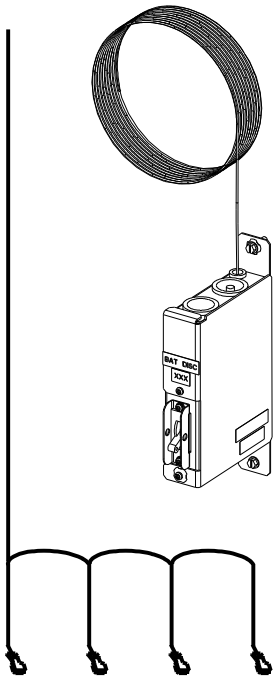
Restrictions

Circuit breakers are ordered separately.

Maximum number of Battery Disconnect Units per system is three (3).

Ordering Notes

1) Order by P/N 535282 as required.
2) Order a circuit breaker for each Battery Disconnect Unit from Table 4.
3) Also order the following lug kits for each battery disconnect circuit breaker ordered: 545581(for use with 8 AWG wire and List 71) **or** 540989 (for use with 10 AWG wire and List 72) **and** 541031 (wire with lugs for connection from battery disconnect to battery string).
4) Also order P/N 524384 Jumper/Alarm Lead if more than one (1) Battery Disconnect Units are to be used (daisy-chains the alarm terminal of up to three [3] Battery Disconnect Units). (Section of alarm lead between Battery Disconnect Units is 30", section of alarm lead between Battery Disconnect Unit and system's alarm terminal is 84".)



Yellow Jumper/Alarm Lead (P/N 524384)
(for use when more than one Battery Disconnect Units are ordered)

Ampere Rating	P/N Electrical/Mechanical Trip[1] (Black Handle)	Ampere Rating	P/N Electrical/Mechanical Trip[1] (Black Handle)
1	256690300	35	256693500
3	256690700	40	256693900
5	256691100	50	256694300
10	256691500	60	256694700
15	256691900	70	256695100
20	256692300	75	256695500
25	256692700	100	256695900
30	256693100		

Circuit Breaker Alarm Operation:
[1] Provides an alarm during an electrical or manual trip condition.

Table 4
Battery Disconnect Unit Circuit Breakers

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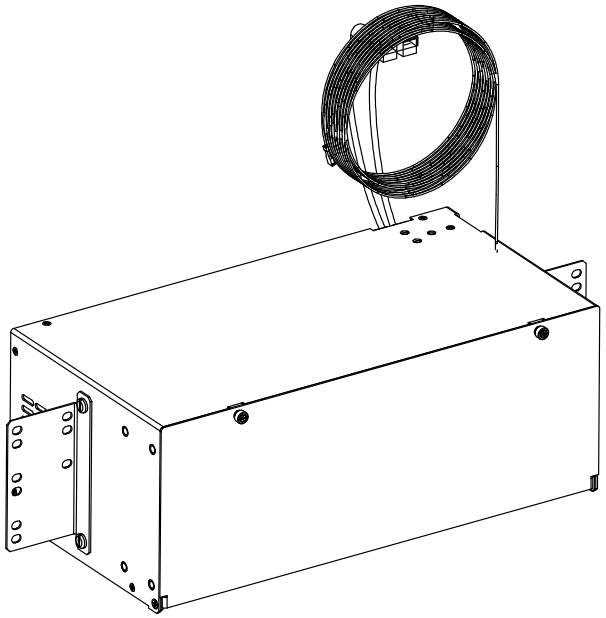
NETSURE™ 201BC Battery Cabinet (Spec. No. 541434)

Features



- The NETSURE™ 201BC Battery Cabinet is rated at 30 amperes, and can be mounted in a 19" or 23" nominal relay rack, or mounted to a suitable wall.
- The Battery Cabinet contains one (1) 40 ampere battery disconnect circuit breaker.
- Battery circuit breaker alarm leads are provided to tie into the power system's alarm circuit.
- The Battery Cabinet is equipped with a battery cable terminated in an Anderson connector.
- Cables to connect the batteries (as specified in the table under *Order Notes)* into the Battery Cabinet provided.
- Battery Cabinets can be paralleled to provide greater reserve time. Battery cabinets contain a second Anderson battery connector for plugging one cabinet into another.

Ordering Notes

1) Order by Spec. No. 541434 as required.
2) Also order four (4) batteries per Battery Cabinet per the following table.

Battery Manufacturer	Manufacturer P/N	Emerson P/N	Capacity Amp-Hours (8Hr rate)	Weight (lb) per Battery
Hawker	SBS 15	139091	14	12.50
Fiamm	12SLA12	139092	12	12.35
EaglePicher	HE-12V7.7FR	139094	6.9	5.94
EaglePicher	HE-12V12.7FR	139093	11.6*	9.68
Enersys	NP18-12FR	139774	16 *	13.60

* 10Hr rate

3) When ordering 139774 batteries, also order 545427 Battery Connection kit.

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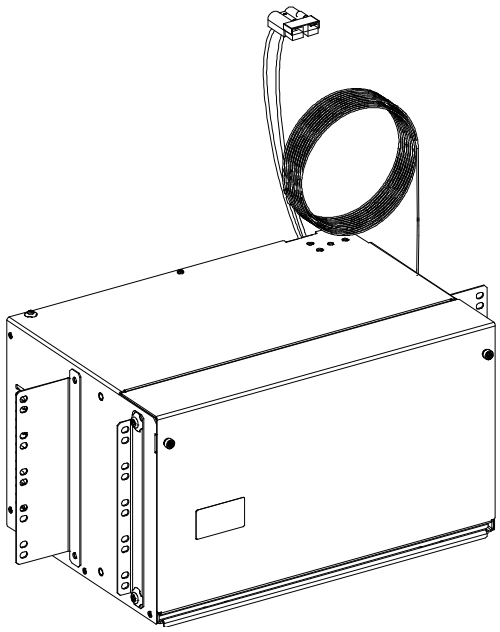
NETSURE™ 211BC Battery Cabinet (Spec. No. 545534)

Features

- The NETSURE™ 211BC Battery Cabinet is rated at 30 amperes, and can be mounted in a 19" or 23" nominal relay rack, or mounted to a suitable wall.
- The Battery Cabinet contains one (1) 40 ampere battery disconnect circuit breaker.
- Battery circuit breaker alarm leads are provided to tie into the power system's alarm circuit.
- The Battery Cabinet is equipped with a battery cable terminated in an Anderson connector.
- Cables to connect the batteries (as specified in the table under *Ordering Notes)* into the Battery Cabinet provided.
- Battery Cabinets can be paralleled to provide greater reserve time. Battery cabinets contain a second Anderson battery connector for plugging one cabinet into another.



Ordering Notes

1) Order by Spec. No. 545534 as required.
2) Also order two (2) batteries per Battery Cabinet per the following table.

Battery Manufacturer	Manufacturer P/N	Emerson P/N	Capacity Amp-Hours (8Hr rate)	Weight (lb) per Battery
Enersys	SBS B10	140553	38	28.20
C&D / Dynasty	TEL12-30	140455	30.5	26.70

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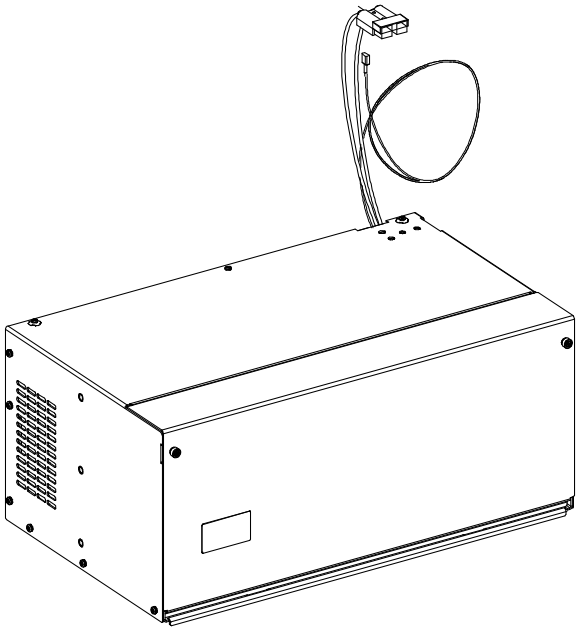
NETSURE™ 211BC Battery Cabinet (Spec. No. 545506)

Features

- The NETSURE™ 211BC Battery Cabinet is rated at 30 amperes, and can be mounted in a 23" nominal relay rack, or mounted to a suitable wall.
- The Battery Cabinet contains one (1) 40 ampere battery disconnect circuit breaker.
- Battery circuit breaker alarm leads are provided to tie into the power system's alarm circuit.
- The Battery Cabinet is equipped with a battery cable terminated in an Anderson connector.
- Cables to connect the batteries (as specified in the table under *Ordering Notes)* into the Battery Cabinet provided.
- Battery Cabinets can be paralleled to provide greater reserve time. Battery cabinets contain a second Anderson battery connector for plugging one cabinet into another.



Ordering Notes

1) Order by Spec. No. 545506 as required.
2) Also order four (4) batteries per Battery Cabinet per the following table.

Battery Manufacturer	Manufacturer P/N	Emerson P/N	Capacity Amp-Hours (8Hr rate)	Weight (lb) per Battery
Enersys	SBS B10	140553	38	28.20
Enersys	SBS 40	140581	38	28.00
C&D/ Dynasty	TEL12-30	140455	30.5	26.70
C&D/ Dynasty	TEL12-45	140454	46	26.70

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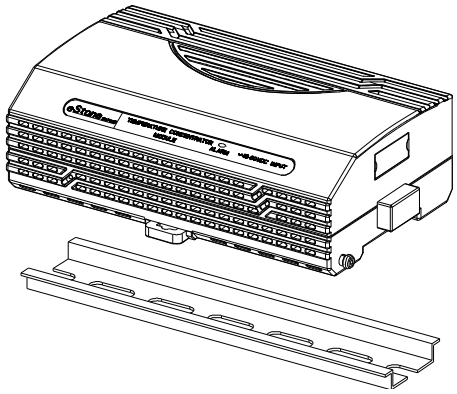
SM TEMP Temperature Concentrator (P/N 547490)



Features

- Allows for multiple temperature probes to be used for temperature compensation. Compensation can be based on highest probe temperature or average probe temperature.
- Provides (8) temperature probe inputs per SM TEMP.
- Can be cascaded up to (8) SM TEMP modules, connecting up to 64 temperature probes.
- Provides analog output for all controllers.

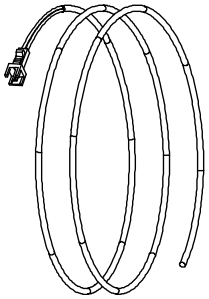
Restrictions

Concentrator needs to plug into analog temp input on IB2 board.

Ordering Notes

1) Order P/N 547490.
2) Order up to (8) List 90 or 91 temperature probes for each concentrator.

SM Module RS-485 Interface Cable P/N 547674



Features

- Provides 4’ cable for connecting SM supervisory modules to the system RS-485 interface connector.
- For interface with SM AC, SM BAT, SM BRC, or SM IO modules.

Restrictions

One (1) RS-485 connector is available in the system.

Ordering Notes

1) Order P/N 547674 as required.

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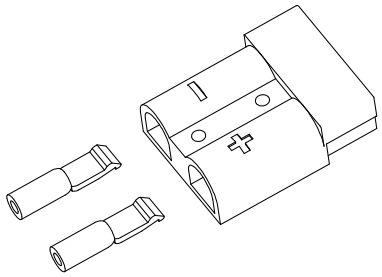
Anderson Battery Connector

Features

- Includes the components necessary to assemble an Anderson connector onto a battery cable.



Restrictions

Appropriate battery post mating lugs must be ordered separately.

Ordering Notes

Order Anderson connector housings and lugs per the following table.

Single Part Number for a Housing and Lugs		
Description	**Emerson P/N**	**Anderson P/N**
For a single string (spare for List 71). Consists of two (2) lugs (Anderson P/N 5952) and one (1) Red Connector (Anderson P/N 992G1). Lugs accept 8 AWG wire. Allows for the connection of one (1) battery string (both polarities) (one wire per lug).	(not available in kit form, order components individually per the second half of this table)	(not available in kit form, order components individually per the second half of this table)
For a double string (spare for List 72). Consists of two (2) lugs (Anderson P/N 5900) and one (1) Red Connector (Anderson P/N 992G1). Lugs accept 6 AWG wires. Allows for the connection of two (2) battery strings (both polarities) (two [10 AWG] wires per lug).	133196	6331G1
Individual Housing and Lugs Part Numbers (spare for List 1, 2, and 71)		
Description	**Emerson P/N**	**Anderson P/N**
Housing	138922	992G1
Lug (accepts 8 AWG wire) (2 required per housing)	247109602	5952

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Digital Input and Relay Output Cables

Features

- **Lists 5 and 6:** Two sets of customer wiring cables are available. One set for the Digital Inputs and another set for the Relay Outputs. One half of the Relay Outputs Cable is provided and factory connected in the shelf. The other half (includes mating connector on one end and un-terminated on the other end) must be ordered separately. Both halves of the Digital Inputs Cable must be ordered separately. When ordered, one half of the Digital Inputs Cable is factory connected in the shelf. The other half has a mating connector on one end and is un-terminated on the other end.
- **Lists 1 and 2:** One set of customer wiring cables is available (Digital Inputs and Relay Outputs). One half of the cable is provided and factory connected in the shelf. The other half (includes mating connector on one end and un-terminated on the other end) must be ordered separately.

Ordering Notes

1) **Lists 5 and 6:** For the Relay Outputs Cable, P/N 541308 (3 ft.) is provided and factory connected in the List 5 and 6 shelf. A mating cable, P/N 541309 (10 ft.) or P/N 545644 (50 ft.), must be ordered separately.

   For the Digital Inputs Cable, order P/N 541310 (shelf side, 3 ft.) and P/N 541311 (customer side, 10 ft.).

   Note: *A custom digital input cable and internal wiring kit is available, P/N 545594. This kit is factory installed only.*

2) **Lists 1 and 2:** For the Digital Inputs and Relay Outputs Cable, P/N 545494 (2 ft.) is provided and factory connected in the List 1 and 2 shelf. The mating cable, P/N 545495 (10 ft.) must be ordered separately.

Replacement Modules

Ordering Notes

1) Refer to Table 5.

Item	Part Number
500W Rectifier Module	1R48500
1000W Rectifier Module	1R481000
Rectifier Module Fan	32010156
SCU+ Controller Module	1M521BNA* * Also specify the appropriate SCU+ configuration file. Refer to the configuration file label on your existing SCU+ Controller.
ACU+ Controller Module	1M820BNA* * Also specify the appropriate ACU+ configuration file. Refer to the configuration file label on your existing ACU+ Controller.
Temperature Probe	Order per List 90 (9 ft. long) or List 91 (30 Ft. long) (or if only one piece of the two piece probe is needed, see the List 90 or 91 description for part numbers)

Table 5
Replacement Module Part Numbers

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Wiring Notes

Refer also to the next section, Wiring Illustrations.

Shelf Frame Grounding Stud (List 1 and 2 Only)

Features

- An M5 frame grounding stud with hardware is provided on the rear of the shelf

Restrictions

Recommended frame ground wire size is 6 AWG.

AC Input Branch Circuit Protection and Wiring

Features

- Each shelf contains one (1) or two (2) side mounted plug-in AC input connector(s).
- AC Input Cable Assemblies/Line Cords are available that plug into the shelf's AC input connector.

Restrictions

Lists 1 and 2 require one (1) AC input branch circuit.
The AC input branch circuit feeds two (2) (List 1) or three (3) (List 2) rectifiers.
Refer to the following table for recommended branch circuit protection.

Lists 5 and 6 require two (2) AC input branch circuits.
Each AC input branch circuit feeds two (2) (List 5) or three (3) (List 6) rectifiers.
Refer to the following table for recommended branch circuit protection.

AC Input Branch Circuit Protection				
System	**208/240VAC Input**		**120VAC Input**	
	500W Rect.	**1000W Rect.**	**500W Rect.**	**1000W Rect.**
58213660001 58213660005 (2-Rectifiers per AC Feed)	15A	15A	15A	20A
58213660002 58213660006 (3-Rectifiers per AC Feed)	15A	20A	20A	25A / 30A

For correct AC input wire size, use the appropriate AC Input Cable Assembly/Line Cord for each AC input branch circuit. Refer to *AC Input Cables and Line Cords* in the ACCESSORY DESCRIPTIONS section of this document.

External Alarm and Monitoring Wiring

Features

- **List 5 and 6:** Relay output and digital input leads are connected to screw-type terminal blocks located on the Customer Interface Board mounted inside the shelf. One half of a Relay Outputs Cable is factory connected to these terminals. The other half (includes mating connector on one end and un-terminated on the other end) is ordered separately. If ordered, one half of a Digital Input Cable is factory connected

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to these terminals. The other half includes a mating connector on one end and is un-terminated on the other end.

- **List 1 and 2:** Relay output and digital input leads are connected to screw-type terminals located on the SCU+ Controller Module mounted inside the shelf. One half of a Digital Input/Relay Output Cable is factory connected to these terminals. The other half (includes mating connector on one end and un-terminated on the other end) is ordered separately.

Restrictions

Recommended Wire Size: 22 AWG for Loop Lengths Up to 200 ft.
18-20 AWG for Loop Lengths Over 200 ft.

Load Distribution Wiring (GMT Fuses) (Lists BG and NG only)

Features

- Load and load return leads are connected to a screw-type terminal block located on the front of the Distribution Unit.

Restrictions

The rating of the distribution device determines the wire size requirements. Refer to the American National Standards Institute (ANSI) approved National Fire Protection Association's (NFPA) National Electrical Code (NEC) and applicable local codes.

Terminal block wire size capacity is 20 to 12 AWG.

Load Distribution Wiring (GMT Fuses) (Lists BF, LF, and NF only)

Features

- Load distribution (GMT fuses) and load return leads are connected to receptacles located inside the Distribution Unit. Load leads are brought into the right side (as viewed from the front) of the shelf and are accessible from the front of the shelf. Note that the GMT distribution fuse block accepts two ranges of fuse amperage sizes, and that two different types of receptacles are provided.

Restrictions

The rating of the distribution device determines the wire size requirements. Refer to the American National Standards Institute (ANSI) approved National Fire Protection Association's (NFPA) National Electrical Code (NEC) and applicable local codes.

Ordering Notes

1) Lists 61 provides 12’ long, 16 AWG, load and load return leads that are terminated on one end with the appropriate mating connector* to plug into the system’s lower amperage rating GMT fuse connector, and are left un-terminated at the remaining end for connection into customer loads.

    * Consists of housing Molex P/N 39-01-2025 and terminals P/N 44476-3112 [loose] or 44476-3111 [reel].

2) Lists 62 provides 12’ long, 14 AWG, load and load return leads that are terminated on one end with the appropriate mating connector* to plug into the system’s higher amperage rating GMT fuse connector, and are left un-terminated at the remaining end for connection into customer loads.

    * Consists of housing Tyco P/N 350777-1 and terminals Tyco P/N 350551-3 [loose] or Tyco 350537-3 [reel].

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Load Distribution Wiring (GMT Fuses) (Lists BC, LC, NC, BA, LA, and NA)

Features

- Load distribution (GMT fuses) and load return leads are connected to receptacles located inside the Distribution Unit. Load leads are brought into the right side (as viewed from the front) of the shelf and are accessible from the front of the shelf.

Restrictions

The rating of the distribution device determines the wire size requirements. Refer to the American National Standards Institute (ANSI) approved National Fire Protection Association's (NFPA) National Electrical Code (NEC) and applicable local codes.

Ordering Notes

1) List 60 provides 12' long, 16 AWG, load and load return leads that are terminated on one end with the appropriate mating connector* to plug into the system's GMT fuse connector, and are left un-terminated at the remaining end for connection into customer loads.

    * Consists of housing Molex P/N 39-01-2025 and terminals P/N 44476-3112 [loose] or 44476-3111 [reel].

Load Distribution Wiring (Optional Bullet-Nose-Type 6-Position GMT Fuse Module)

Features

- Load and load return leads are connected to a screw-type terminal block located on the front of the Fuse Module.

Restrictions

The rating of the distribution device determines the wire size requirements. Refer to the American National Standards Institute (ANSI) approved National Fire Protection Association's (NFPA) National Electrical Code (NEC) and applicable local codes.

Terminal block wire size capacity is 24 to 14 AWG.

Load Distribution Wiring (Circuit Breakers) (Lists BC, LC, NC, BA, LA, and NA)

Features

- Load distribution (circuit breakers) and load return leads terminated in two-hole lugs are connected to threaded studs located inside the Distribution Unit. Load leads are brought into the right side (as viewed from the front) of the shelf and are accessible from the front of the shelf.

Restrictions

The rating of the distribution device determines the wire size requirements. Refer to the American National Standards Institute (ANSI) approved National Fire Protection Association's (NFPA) National Electrical Code (NEC) and applicable local codes.

All lugs for customer connections must be ordered separately. Mounting hardware is factory supplied.

Maximum size of wire to be connected to a single lug position is 6 AWG when all four (4) circuit breaker positions are used and 2 AWG when only two (2) are used. When using lugs for #4 and #2 AWG wire, recommended to use a customer supplied flat washer between the lug and the nut supplied on the termination.

Ordering Notes

1) The rating of the distribution device determines the wire size requirements. For wire size and lug selection, refer to Table 6.

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2) For other available lugs, refer to drawings 031110100 through 031110300.

Circuit Breaker Amperage	Recm 90°C Wire Size (1)						
	14 AWG	12 AWG	10 AWG	8 AWG	6 AWG	4 AWG	2 AWG
	Loop Length (feet) (2)						
1, 3, 5, 10A	37 (3, 4, 5)	58 (3, 4, 5)	93 (3, 4, 5)	148 (3, 4, 5)	236 (3, 4, 5)	--	--
15A	24 (3, 4)	39 (3, 4, 5)	62 (3, 4, 5)	99 (3, 4, 5)	157 (3, 4, 5)	--	--
20A	--	29 (3, 4)	46 (3, 4, 5)	74 (3, 4, 5)	118 (3, 4, 5)	--	--
25A	--	--	37 (3, 4,)	59 (3, 4, 5)	94 (3, 4, 5)	--	--
30A	--	--	31 (3, 4)	49 (3, 4, 5)	78 (3, 4, 5)	--	--
35A	--	--	--	42 (3, 4)	67 (3, 4, 5)	107 (3, 4)	--
40A	--	--	--	37 (3, 4)	59 (3, 4, 5)	94 (3, 4)	--
45A	--	--	--	33 (3, 4)	52 (3, 4)	83 (3, 4)	--
50A	--	--	--	29 (3)	47 (3, 4,)	75 (3, 4)	--
60A	--	--	--	--	39 (3, 4)	62 (3, 4)	99 (3, 4)
70A						53 (3, 4)	85 (3, 4)
75A						50 (3, 4)	79 (3, 4)
80A						47 (3, 4)	74 (3, 4)
90A						41 (3)	66 (3, 4)
100A						--	59 (3, 4)
Recommended Crimp Lug (6)							
2-hole	245390100	245390100	245390100	245346600	245346500	245346800	245346900

1 Wire sizes are based on recommendations of the American National Standards Institute (ANSI) approved National Fire Protection Association's (NFPA) National Electrical Code (NEC). **Table 310-16** for wire rated at **90°C** conductor temperature operating in ambient temperatures of **40°C**, **50°C**, and **65°C** was used. For other operating ambient temperatures, refer to the NEC. For operation in countries where the NEC is not recognized, follow applicable codes.

2 Recommended wire sizes are sufficient to restrict voltage drop to 1.0 volt or less at listed branch current for the loop lengths shown. Loop length is the sum of the lengths of the positive and negative leads.

3 Wire Size / Loop Length Combination Calculated using 40°C Ambient Operating Temperature.

4 Wire Size / Loop Length Combination Calculated using 50°C Ambient Operating Temperature.

5 Wire Size / Loop Length Combination Calculated using 65°C Ambient Operating Temperature.

6 Two-hole lugs are 10-32 bolt clearance on 5/8" centers. Refer to drawing 031110100 for lug crimping information.

Table 6
Recommended Battery and Load Distribution Wire Size and Lug Selection
(Bullet Nose-Type Circuit Breaker)

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Load Distribution Wiring (GMT Fuses) (List KG)

Features

- Load distribution (GMT fuses) and load return leads are connected to terminal blocks located on the front of the assembly.

Restrictions

The rating of the distribution device determines the wire size requirements. Refer to the American National Standards Institute (ANSI) approved National Fire Protection Association's (NFPA) National Electrical Code (NEC) and applicable local codes.

Terminal block wire size capacity is 26 to 14 AWG.

CO Ground Wiring (Lists BF, LF, NF, BC, LC, NC, BA, LA, and NA)

Features

- Two 10-32 studs on 5/8" centers with hardware are provided on the Return Bus for CO Ground wiring.

Restrictions

Recommended CO ground wire size is 6 AWG.

Recommended lug is 245346500 (2-hole, 10-32 clearance holes, 5/8" centers).

Input Battery Wiring (List BG and NG)

Features

- Two (2) 8 AWG 48" long battery cables are factory connected inside the shelf. These cables are terminated at the customer end in a Red SB50 Anderson battery connector. A mating Anderson battery connector is provided [Housing: Emerson P/N 138922, Anderson Power Products P/N 992G1. Contacts (two provided): Emerson P/N 247109602, Anderson Power Products P/N 5952].
- Additional strings of battery may be connected to the system using the available battery cable kits (see List 71 and List 72).

Restrictions

Battery leads are NOT internally fused.

Input Battery Wiring (to Battery Disconnect Circuit Breakers) (Lists BA, LA, and NA)

Features

- Battery and battery return leads terminated in two-hole lugs are connected to threaded studs located inside the Distribution Unit. Battery leads are brought into the right side (as viewed from the front) of the shelf and are accessible from the front of the shelf.

Restrictions

The rating of the distribution device determines the wire size requirements. Refer to the American National Standards Institute (ANSI) approved National Fire Protection Association's (NFPA) National Electrical Code (NEC) and applicable local codes.

All lugs for customer connections must be ordered separately. Mounting hardware is factory supplied.

Maximum size of wire to be connected to a single lug position is 6 AWG when all four (4) circuit breaker positions are used and 2 AWG when only two (2) are used. When using lugs for #4 and #2 AWG wire,

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recommended to use a customer supplied flat washer between the lug and the nut supplied on the termination.

Ordering Notes

1) The rating of the distribution device determines the wire size requirements. For wire size and lug selection, refer to Table 6.

2) For other available lugs, refer to drawings 031110100 through 031110300.

Input Battery Wiring (to Battery Busbars) (Lists BF, LF, NF, BC, LC, and NC)

Features

- Battery and battery return leads terminated in two-hole lugs are connected to threaded studs located inside the Distribution Unit. Battery leads are brought into the right side (as viewed from the front) of the shelf and are accessible from the front of the shelf.

Restrictions

All lugs for customer connections must be ordered separately. Mounting hardware is factory supplied.

Maximum size of wire to be connected to a single lug position is 2 AWG.

Maximum lug width, 0.61 inches.

Ordering Notes

1) Battery wire size varies depending on load, therefore no specific information is provided for wire size. When making connections, observe correct polarity.

2) List 65 and List 66 provide 2 AWG “shelf side” and “battery side” (respectively) battery cables.

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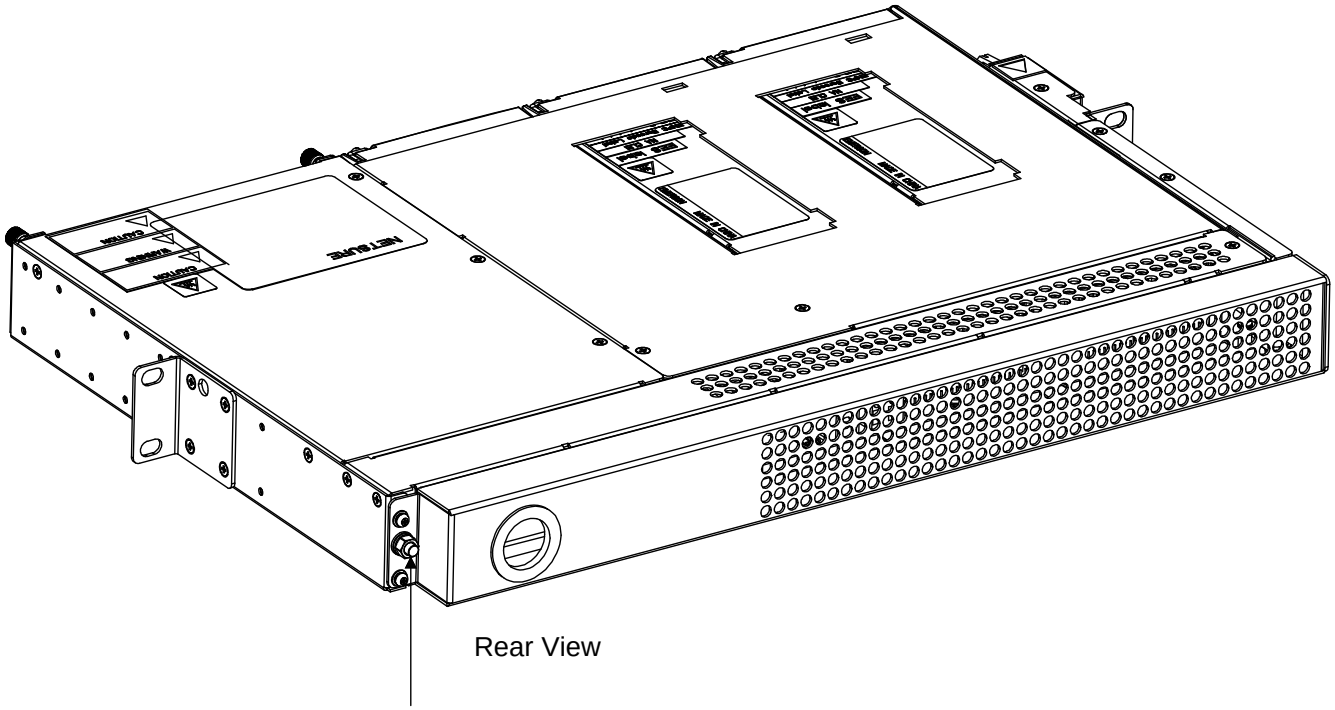
Wiring Illustrations

Shelf Frame Grounding Stud (List 1 and 2 Only)



Rear View

Connect a frame grounding lead to this stud, if required.

Stud is a Size M5.

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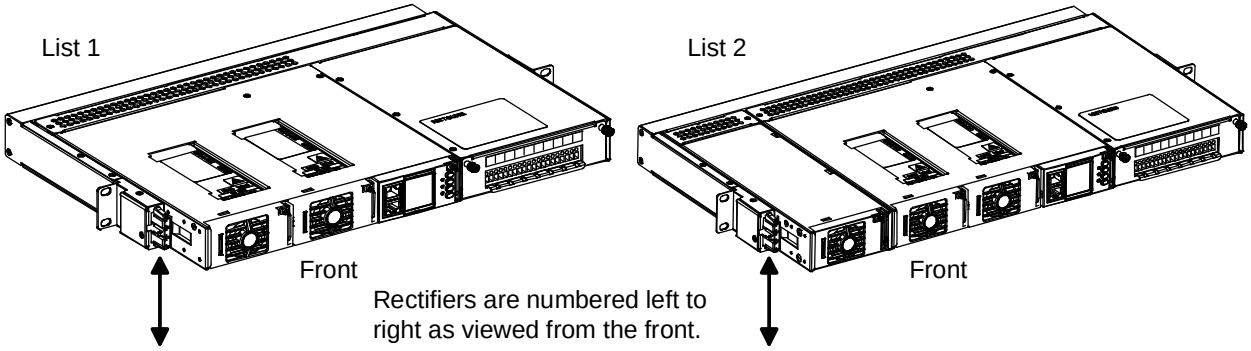
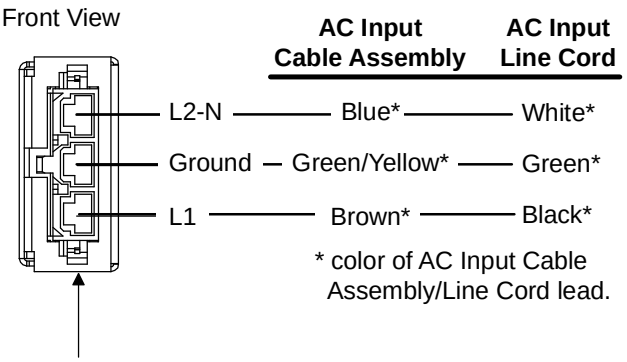
AC Input Wiring (Lists 1 and 2)


List 1
List 2
Front
Front
Rectifiers are numbered left to right as viewed from the front.
AC input connections are made using the supplied AC input cable assemblies/ line cords connected here.
AC input connections are made using the supplied AC input cable assemblies/ line cords connected here.



ENSURE THE PROPER VOLTAGE AC BRANCH CIRCUIT AND LINE CORDS WITH THE APPROPRIATE PLUG ARE USED FOR YOUR APPLICATION.

500W Rectifier: 120/208/240 VAC Input
1000W Rectifier: 120/208/240 VAC Input

*** AC Input Cable Assembly / Line Cords**

Part Number	Customer End	
545232	unterminated	(List 1 & 2)
540946	L6-30P	(List 1 & 2)
545252	L5-30P	(List 1 & 2)
545478	5-15P	(List 1 w/ R48-500)
545479	L5-15P	(List 1 w/ R48-500)
545480	L6-15P	(List 1; List 2 w/ R48-500)
545481	L5-20P	(List 1; List 2 w/ R48-500)
545553	L6-20P	(List 1 & 2)
545616	L6-30P	(List 1 & 2)
547525	L5-30P	(List 1 & 2)
548457	5-15P	(List 1 w/ R48-500)
548196	IEC320 C20	(List 1 120/208/240V & List 2 208/240 w/ R48-500 or R48-1000; List 2 120V w/ R48-500 only.)

"WARNING - HIGH LEAKAGE CURRENT." An industrial style plug is required when providing power to three (3) or more Rectifier Modules with a flexible cord. Plug and outlet types 1-15, 2-15, 2-20, 5-15, and 5-20 as specified in IEC 60083 are considered to be NON-INDUSTRIAL within the meaning of this standard.

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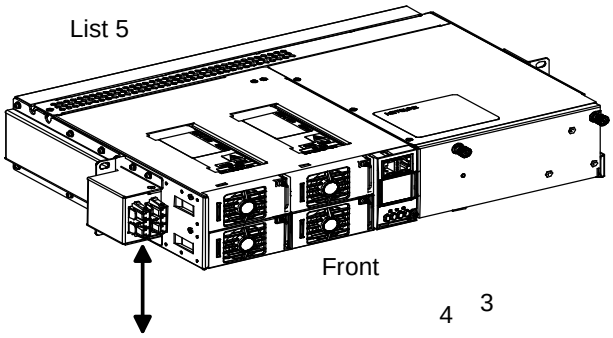
AC Input Wiring (Lists 5 and 6)

List 5



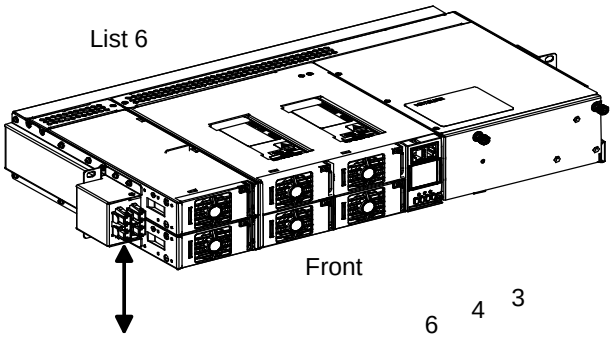
Front

AC input connections are made using the supplied AC input cable assemblies/ line cords connected here.

4 3
2 1

Rectifiers are numbered as shown above

List 6



Front

AC input connections are made using the supplied AC input cable assemblies/ line cords connected here.

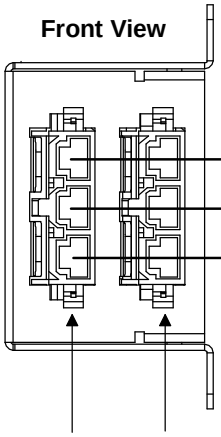
6 4 3
5 2 1

Rectifiers are numbered as shown above

ENSURE THE PROPER VOLTAGE AC BRANCH CIRCUIT AND LINE CORDS WITH THE APPROPRIATE PLUG ARE USED FOR YOUR APPLICATION.

500W Rectifier: 120/208/240 VAC Input
1000W Rectifier: 120/208/240 VAC Input

Front View



	AC Input Cable Assembly	AC Input Line Cord
L2-N	Blue*	White*
Ground	Green/Yellow*	Green*
L1	Brown*	Black*

* color of AC Input Cable Assembly/Line Cord lead.

Nominal 120/208/240V AC Input for Rectifier Module:
List 5 (19" Shelf): #1 and #2
List 6 (23" Shelf): #1, #2, and #5

Nominal 120/208/240V AC Input for Rectifier Module:
List 5 (19" Shelf): #3 and #4
List 6 (23" Shelf): #3, #4, and #6

*** AC Input Cable Assembly / Line Cords**

Part Number	Customer End	
545232	unterminated	(List 5 & 6)
540946	L6-30P	(List 5 & 6)
545252	L5-30P	(List 5 & 6)
545478	5-15P	(List 5 w/ R48-500)
545479	L5-15P	(List 5 w/ R48-500)
545480	L6-15P	(List 5; List 6 w/ R48-500)
545481	L5-20P	(List 5; List 6 w/ R48-500)
545553	L6-20P	(List 5 & 6)
545616	L6-30P	(List 5 & 6)
547525	L5-30P	(List 5 & 6)
548457	5-15P	(List 5 w/ R48-500)
548196	IEC320 C20	(List 5 120/208/240V & List 6 208/240 w/ R48-500 or R48-1000; List 6 120V w/ R48-500 only.)

"WARNING - HIGH LEAKAGE CURRENT." An industrial style plug is required when providing power to three (3) or more Rectifier Modules with a flexible cord. Plug and outlet types 1-15, 2-15, 2-20, 5-15, and 5-20 as specified in IEC 60083 are considered to be NON-INDUSTRIAL within the meaning of this standard.

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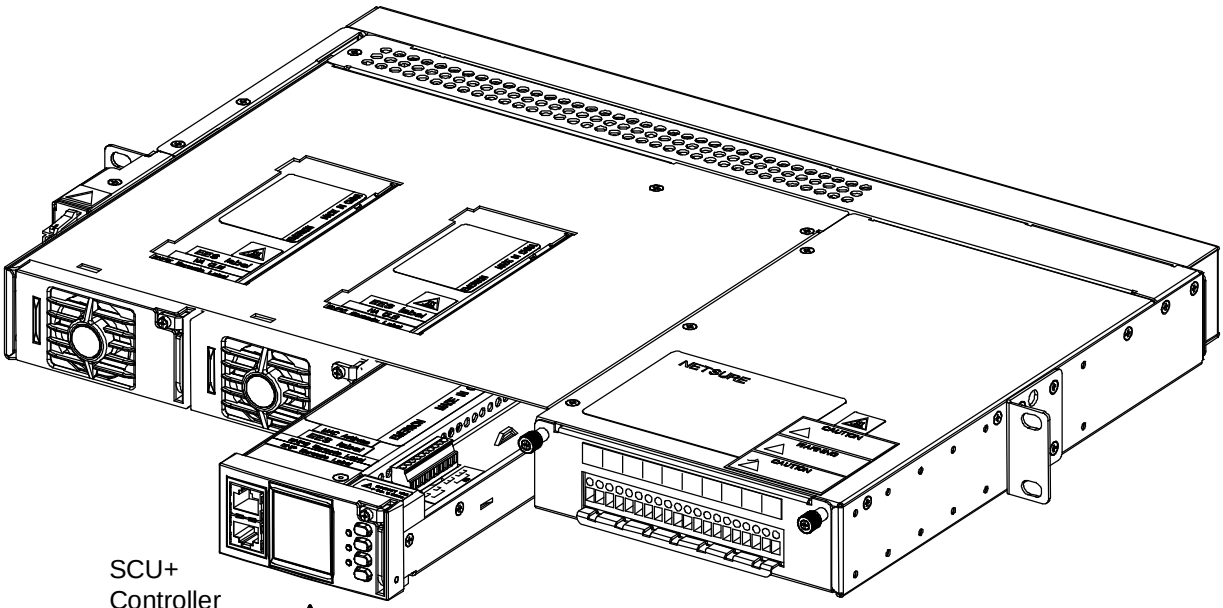
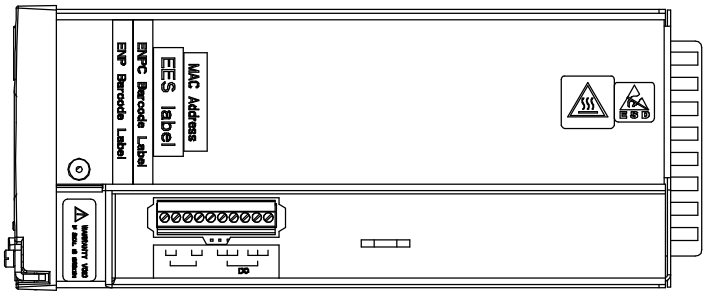
External Alarm and Monitoring Wiring (Lists 1 and 2)



SCU+
Controller



SCU+ Controller
(Top View)

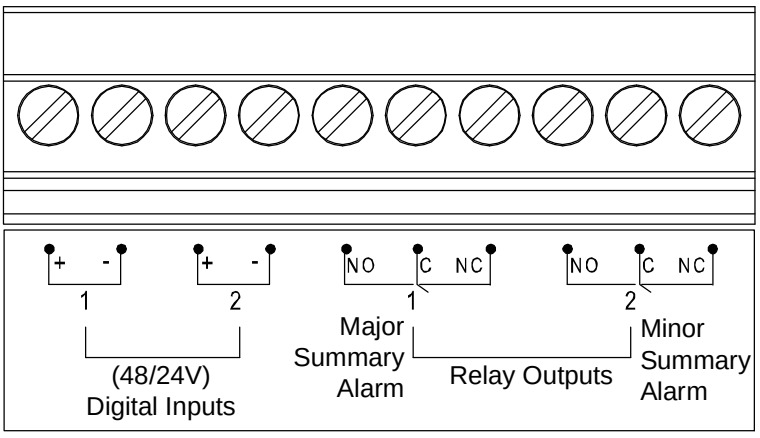
Notes

Relay Output/Digital Input Cable P/N 545494 is factory connected to terminals. Mating half (w/ unterminated ends) available, P/N 545495.

Digital Input 1 is factory wired to Load Breaker / Fuse Alarm.

Digital Input 2 default is External Battery Disconnect Circuit Breaker Alarm.

A factory-connected jumper supplies +BAT (Battery Return) to the positive side of Digital Input #2.



When ordered, Temperature Probe leads are factory connected to SCU+ Connector Board located in the Distribution Unit. These are labeled T1 and T2.

NC = Normally Closed
COM = Common
NO = Normally Open

All relay contacts are shown with the relay deenergized.

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External Alarm and Monitoring Wiring (Lists 5 and 6)

Note: *A custom digital input cable and internal wiring kit is available, P/N 545594. This kit is factory installed only.*

Notes

Relay Output Cable P/N 541308 is factory connected to Relay Output terminals.
Mating half (w/ unterminated ends) available, P/N 541309.

If ordered, Digital Input Cable P/N 541310 is factory connected to Digital Input terminals.
Mating half (w/ unterminated ends) available, P/N 541311.

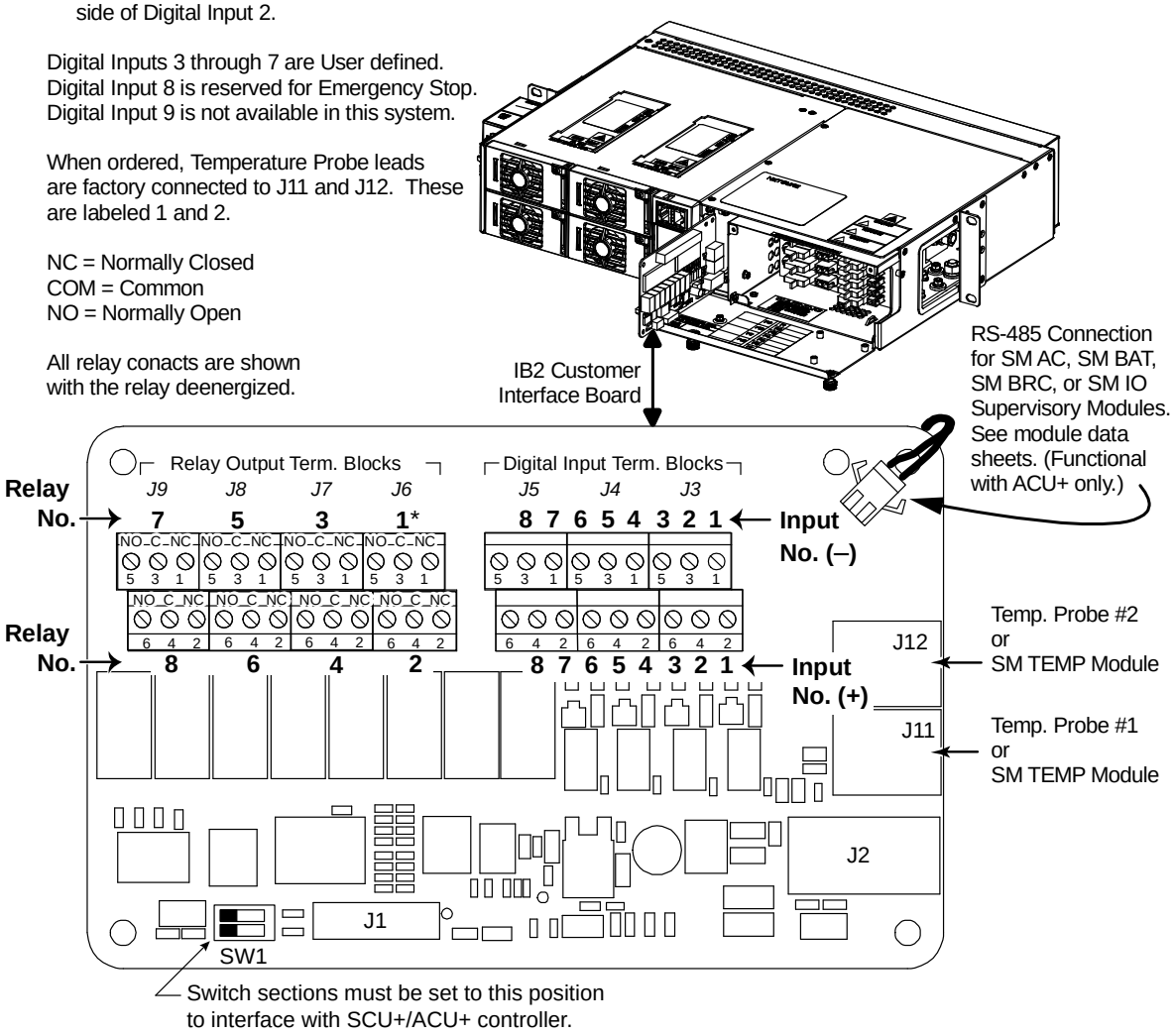
Digital Input 1 is factory wired to Load Breaker / Fuse Alarm.
Digital Input 2 is reserved for External Battery Breaker Alarm.
A factory connected jumper supplies +BAT (Battery Return) to the positive side of Digital Input 2.

Digital Inputs 3 through 7 are User defined.
Digital Input 8 is reserved for Emergency Stop.
Digital Input 9 is not available in this system.

When ordered, Temperature Probe leads are factory connected to J11 and J12. These are labeled 1 and 2.

NC = Normally Closed
COM = Common
NO = Normally Open

All relay conacts are shown with the relay deenergized.


IB2 Customer Interface Board
RS-485 Connection for SM AC, SM BAT, SM BRC, or SM IO Supervisory Modules. See module data sheets. (Functional with ACU+ only.)
Relay Output Term. Blocks
Digital Input Term. Blocks
J9 J8 J7 J6
J5 J4 J3
Relay No.
7 5 3 1*
8 7 6 5 4 3 2 1
Input No. (–)
NO C NC
5 3 1
6 4 2
Relay No.
8 6 4 2
8 7 6 5 4 3 2 1
Input No. (+)
J12
Temp. Probe #2 or SM TEMP Module
J11
Temp. Probe #1 or SM TEMP Module
J2
J1
SW1
Switch sections must be set to this position to interface with SCU+/ACU+ controller.

* The relay assigned by the Controller to be the"Major Summary" (SCU+) or "Critical Summary" (ACU+) alarm (relay 1 by default) will operate in the "Fail Safe Mode". "Fail Safe Mode" means Relay 1 is de-energized during an alarm condition, opening the contacts between the C and NO terminals, and closing the contacts between the C and NC terminals.

The remaining seven (7) alarm relays energize during an alarm condition, closing the contacts between the C and NO terminals, and opening the contacts between the C and NC terminals.

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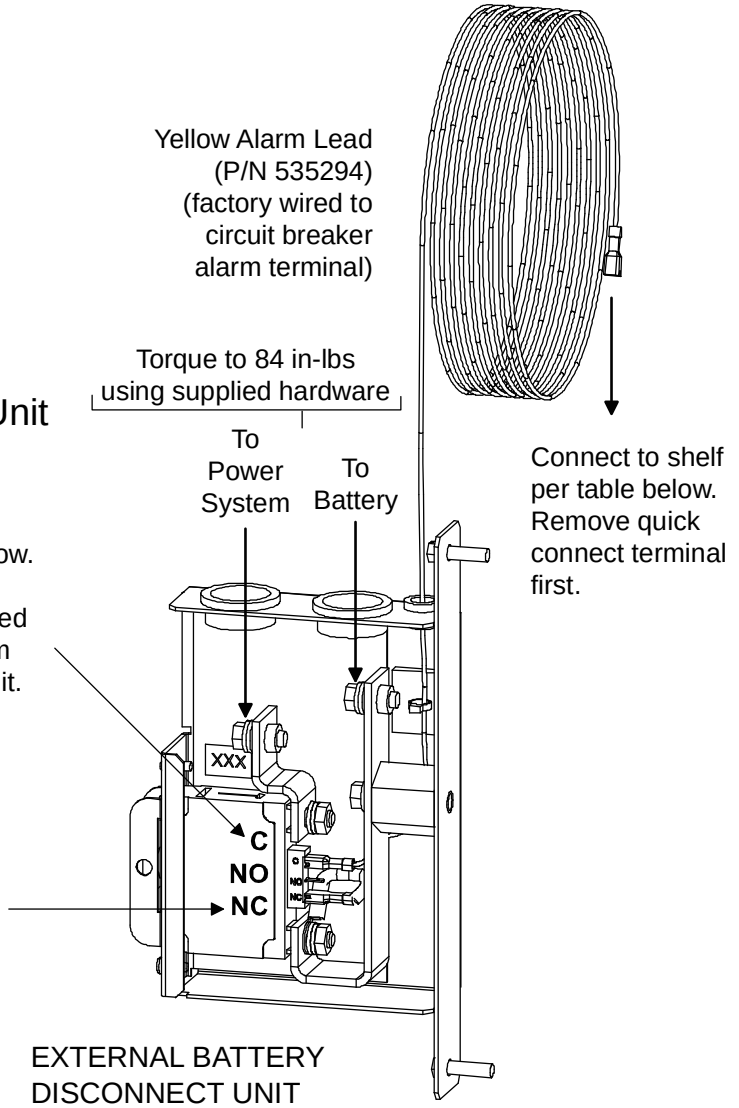
Alarm Wiring to a Single External Battery Disconnect Unit

Procedure

1. Connect YELLOW lead exiting top of Battery Disconnect Unit per table below. Remove quick connect terminal first. The YELLOW lead is factory connected to circuit breaker “C (Common)” alarm terminal in the Battery Disconnect Unit.
2. There is NO connection to the circuit breaker “NO (Normally Open)” alarm terminal.
3. Connect loose end of Jumper factory connected to bottom terminal on circuit breaker to circuit breaker “NC (Normally Closed)” alarm terminal.



EXTERNAL BATTERY DISCONNECT UNIT

(Side cover removed in illustration to show wiring details.)

External Battery Disconnect Circuit Breaker Alarm Input:
A battery disconnect circuit breaker alarm is activated when the circuit breaker is in the OFF position, and provides -48VDC to Digital Input # 2.

BREAKER ALARM CONNECTION			
Shelf List	Alarm Cable on shelf		CONNECT YELLOW WIRE TO:
1 or 2	545495	NO YES	Must order Cable 545495 R-BK Lead of 545495. Splice and heat shrink tubing included with 545495
5 or 6	541311	NO YES	Pin 3 of J3 on customer interface BD (negative side of Digital Input # 2) O-R Lead of 541311. Splice and heat shrink tubing included with 541311

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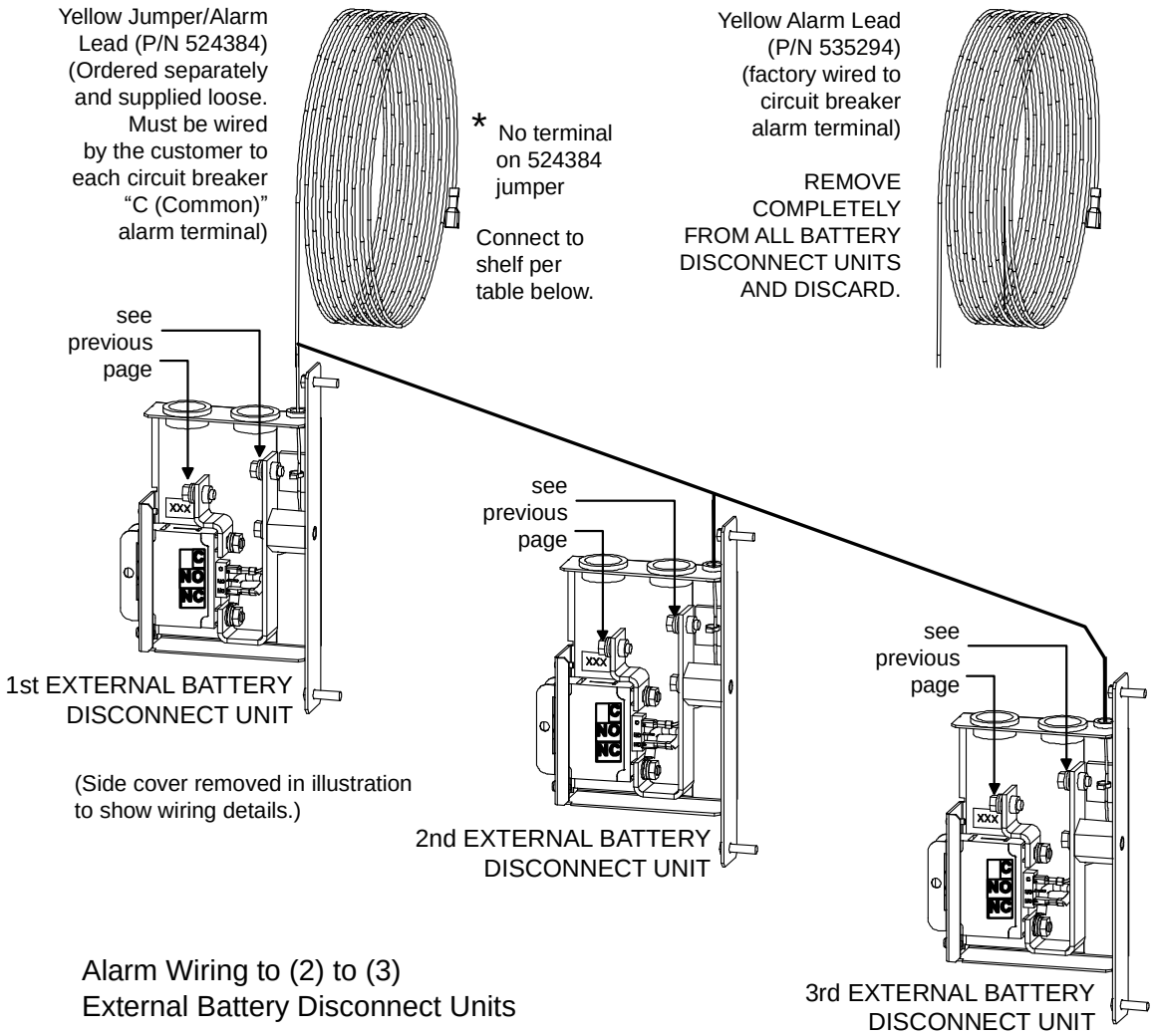
Yellow Jumper/Alarm Lead (P/N 524384) (Ordered separately and supplied loose. Must be wired by the customer to each circuit breaker "C (Common)" alarm terminal)
* No terminal on 524384 jumper
Connect to shelf per table below.
Yellow Alarm Lead (P/N 535294) (factory wired to circuit breaker alarm terminal)
REMOVE COMPLETELY FROM ALL BATTERY DISCONNECT UNITS AND DISCARD.
see previous page
see previous page
see previous page
1st EXTERNAL BATTERY DISCONNECT UNIT
(Side cover removed in illustration to show wiring details.)
2nd EXTERNAL BATTERY DISCONNECT UNIT
3rd EXTERNAL BATTERY DISCONNECT UNIT
C
NO
NC
XXX

Alarm Wiring to (2) to (3) External Battery Disconnect Units

Procedure

1. Completely remove YELLOW lead exiting top of ALL Battery Disconnect Units and discard.
2. Connect separately ordered YELLOW jumper/alarm lead (P/N 524384) to circuit breaker "C (Common)" alarm terminals in ALL Battery Disconnect Units. Connect remaining end per table below.
3. There is NO connection to the circuit breaker "NO (Normally Open)" alarm terminal.
4. In ALL Battery Disconnect Units, . connect loose end of Jumper factory connected to bottom terminal on circuit breaker to circuit breaker "NC (Normally Closed)" alarm terminal.

External Battery Disconnect Circuit Breaker Alarm Input:
A battery disconnect circuit breaker alarm is activated when the circuit breaker is in the OFF position, and provides -48VDC to Digital Input # 2.

BREAKER ALARM CONNECTION			
Shelf List	Alarm Cable on shelf		CONNECT YELLOW WIRE TO:
1 or 2	545495	NO YES	Must order Cable 545495 R-BK Lead of 545495. Splice and heat shrink tubing included with 545495
5 or 6	541311	NO YES	Pin 3 of J3 on customer interface BD (negative side of Digital Input # 2) O-R Lead of 541311. Splice and heat shrink tubing included with 541311

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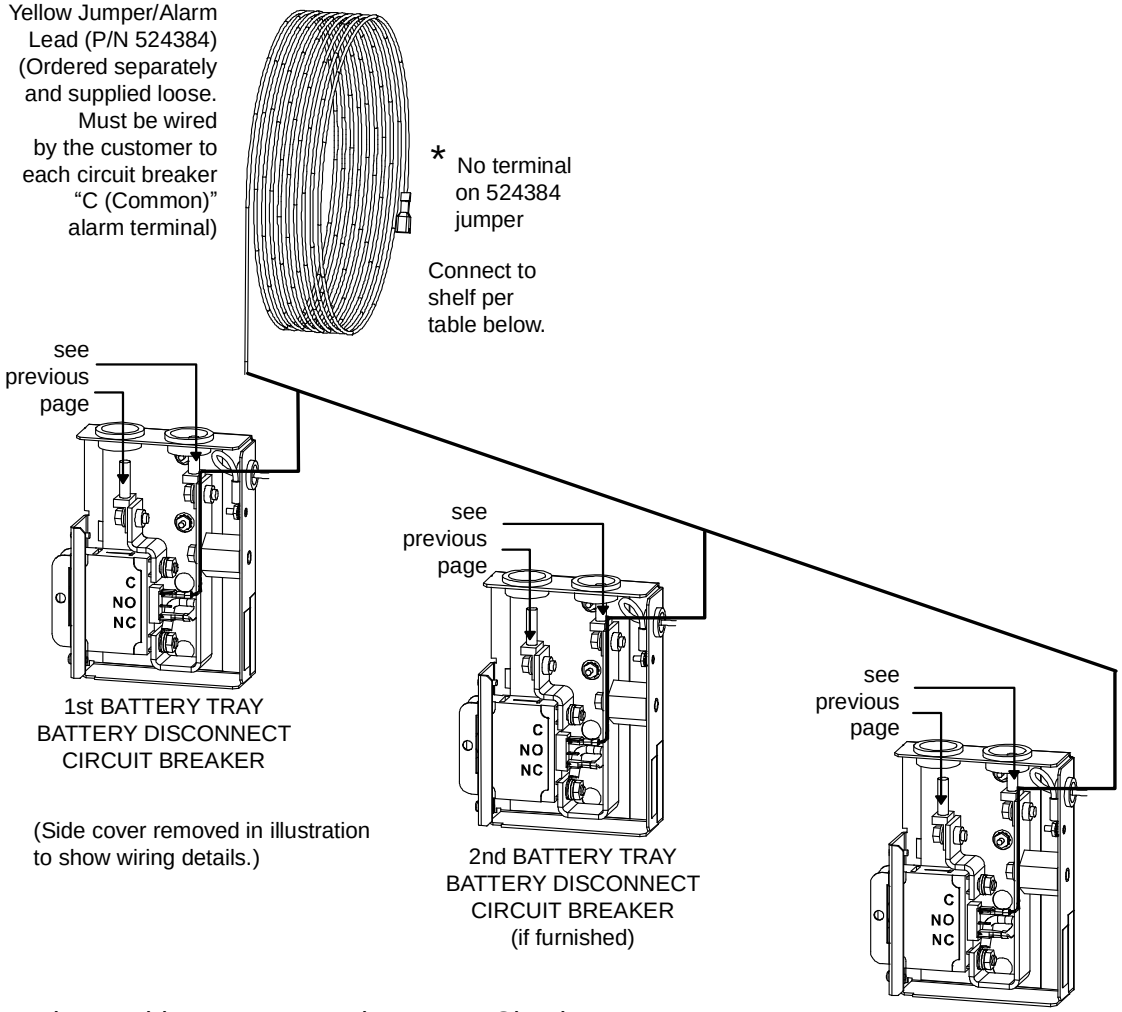
Yellow Jumper/Alarm Lead (P/N 524384) (Ordered separately and supplied loose. Must be wired by the customer to each circuit breaker "C (Common)" alarm terminal)
* No terminal on 524384 jumper
Connect to shelf per table below.
see previous page
C
NO
NC
1st BATTERY TRAY BATTERY DISCONNECT CIRCUIT BREAKER
(Side cover removed in illustration to show wiring details.)
see previous page
C
NO
NC
2nd BATTERY TRAY BATTERY DISCONNECT CIRCUIT BREAKER (if furnished)
see previous page
C
NO
NC
3rd BATTERY TRAY BATTERY DISCONNECT CIRCUIT BREAKER (if furnished)

Alarm Wiring to Battery Disconnect Circuit Breakers when (1) to (3) Battery Trays are Used

Procedure

1. Connect kit-supplied YELLOW jumper/alarm lead (P/N 524384) to circuit breaker "C (Common)" alarm terminals on ALL Battery Disconnect Circuit Breakers. Connect remaining per table below.
2. There is NO connection to the circuit breaker "NO (Normally Open)" alarm terminal.
3. On ALL Battery Disconnect circuit breakers, there should be a factory connected Jumper connected from the bottom terminal on the circuit breaker to the circuit breaker "NC (Normally Closed)" alarm terminal.

External Battery Disconnect Circuit Breaker Alarm Input:
A battery disconnect circuit breaker alarm is activated when the circuit breaker is in the OFF position, and provides -48VDC to Digital Input # 2.

BREAKER ALARM CONNECTION			
Shelf List	Alarm Cable on shelf		CONNECT YELLOW WIRE TO:
1 or 2	545495	NO YES	Must order Cable 545495 R-BK Lead of 545495. Splice and heat shrink tubing included with 545495
5 or 6	541311	NO YES	Pin 3 of J3 on customer interface BD (negative side of Digital Input # 2) O-R Lead of 541311. Splice and heat shrink tubing included with 541311

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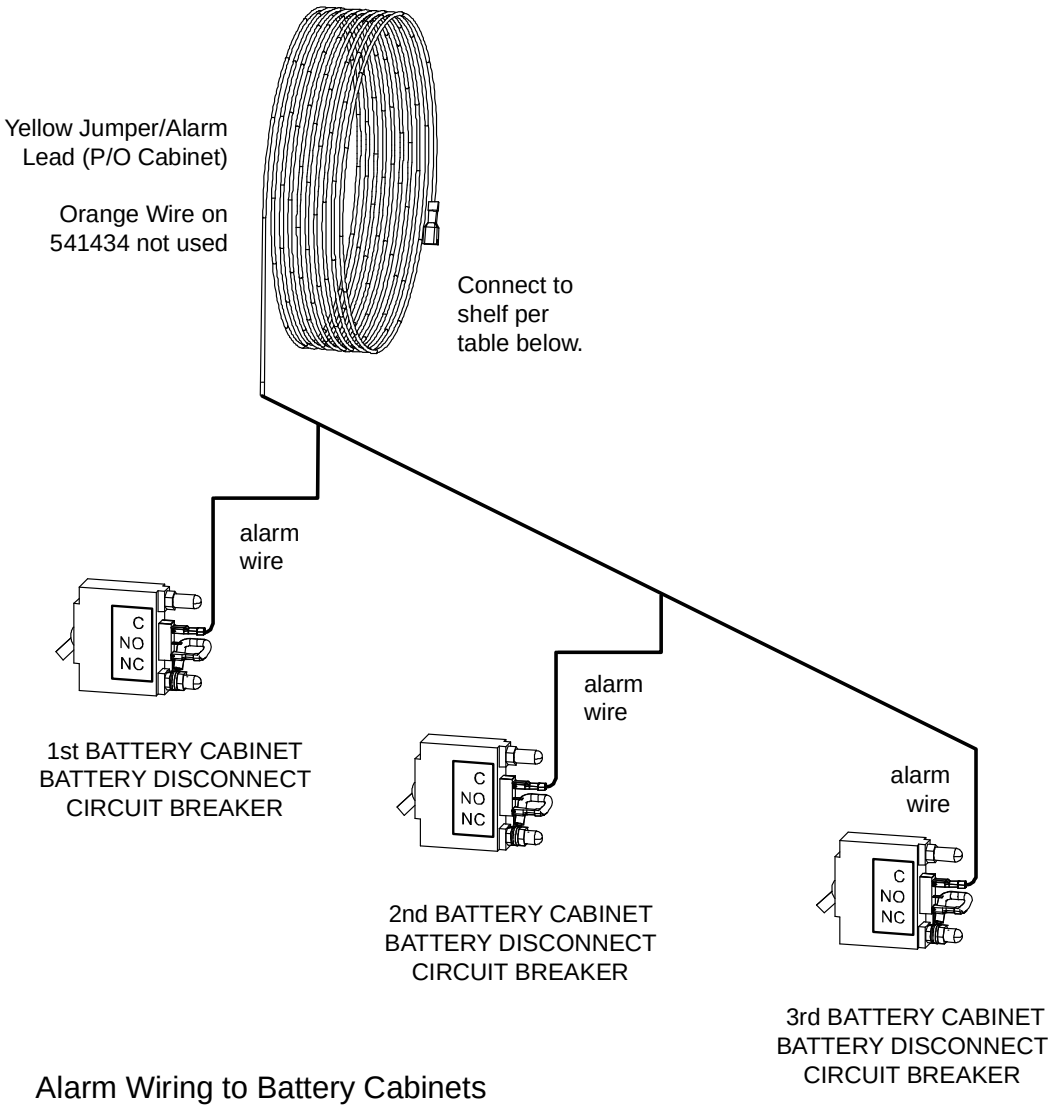

Alarm Wiring to Battery Cabinets

Procedure

1. Remove quick connect terminal from YELLOW battery cabinet alarm lead.
2. Wire per table below.

External Battery Disconnect Circuit Breaker Alarm Input:
A battery disconnect circuit breaker alarm is activated when the circuit breaker is in the OFF position, and provides -48VDC to Digital Input # 2.

BREAKER ALARM CONNECTION			
Shelf List	Alarm Cable on shelf		CONNECT YELLOW WIRE TO:
1 or 2	545495	NO YES	Must order Cable 545495 R-BK Lead of 545495. Splice and heat shrink tubing included with 545495
5 or 6	541311	NO YES	Pin 3 of J3 on customer interface BD (negative side of Digital Input # 2) O-R Lead of 541311. Splice and heat shrink tubing included with 541311

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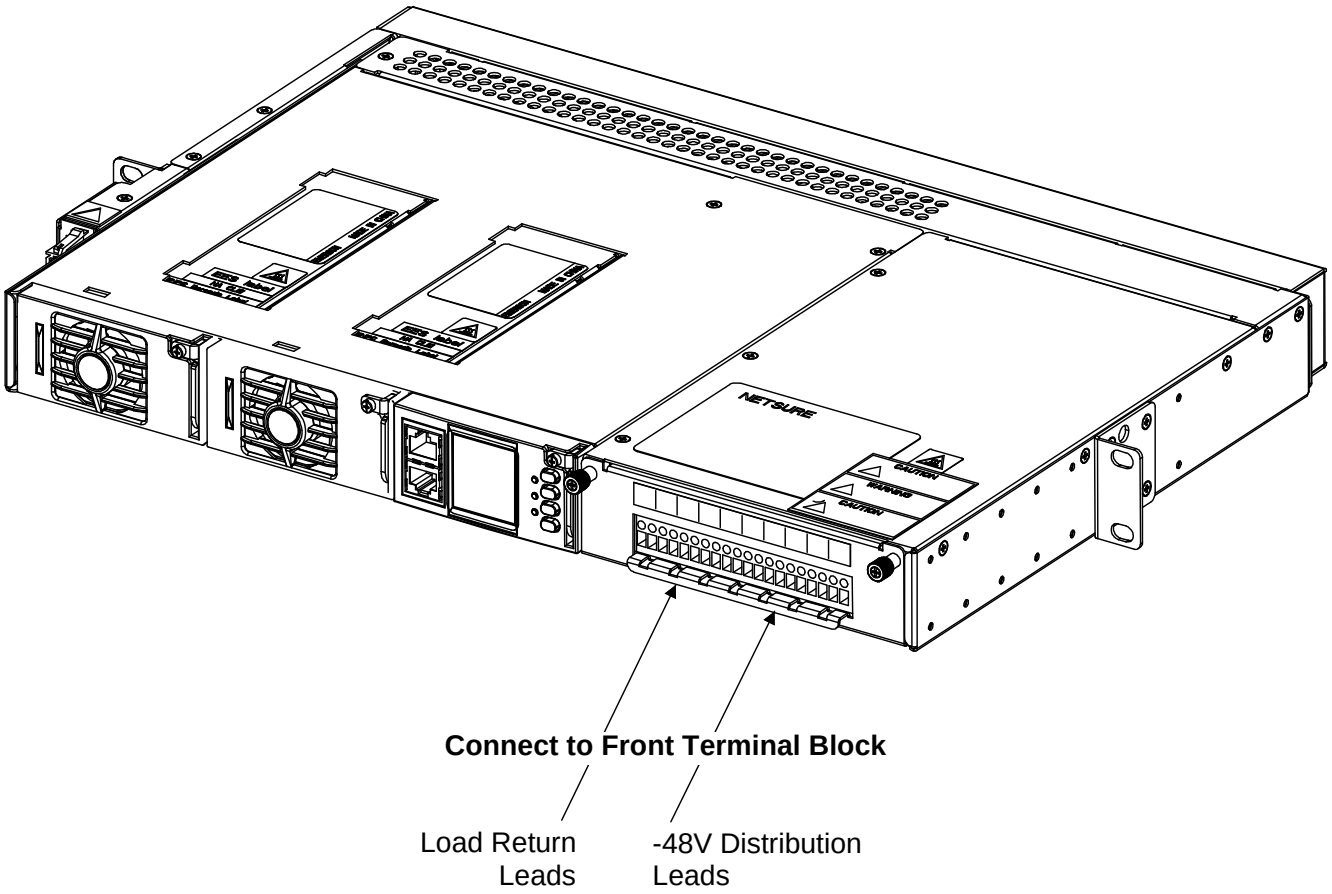
Load Distribution Wiring (GMT Fuses) (Lists BG and NG installed in a List 1 or 2, List 1 shown)



Fuse Position	Terminal	
	Load Return	Load (-48V)
1	1	2
2	3	4
3	5	6
4	7	8
5	9	10
6	11	12
7	13	14
8	15	16
9	17	18
10	19	20

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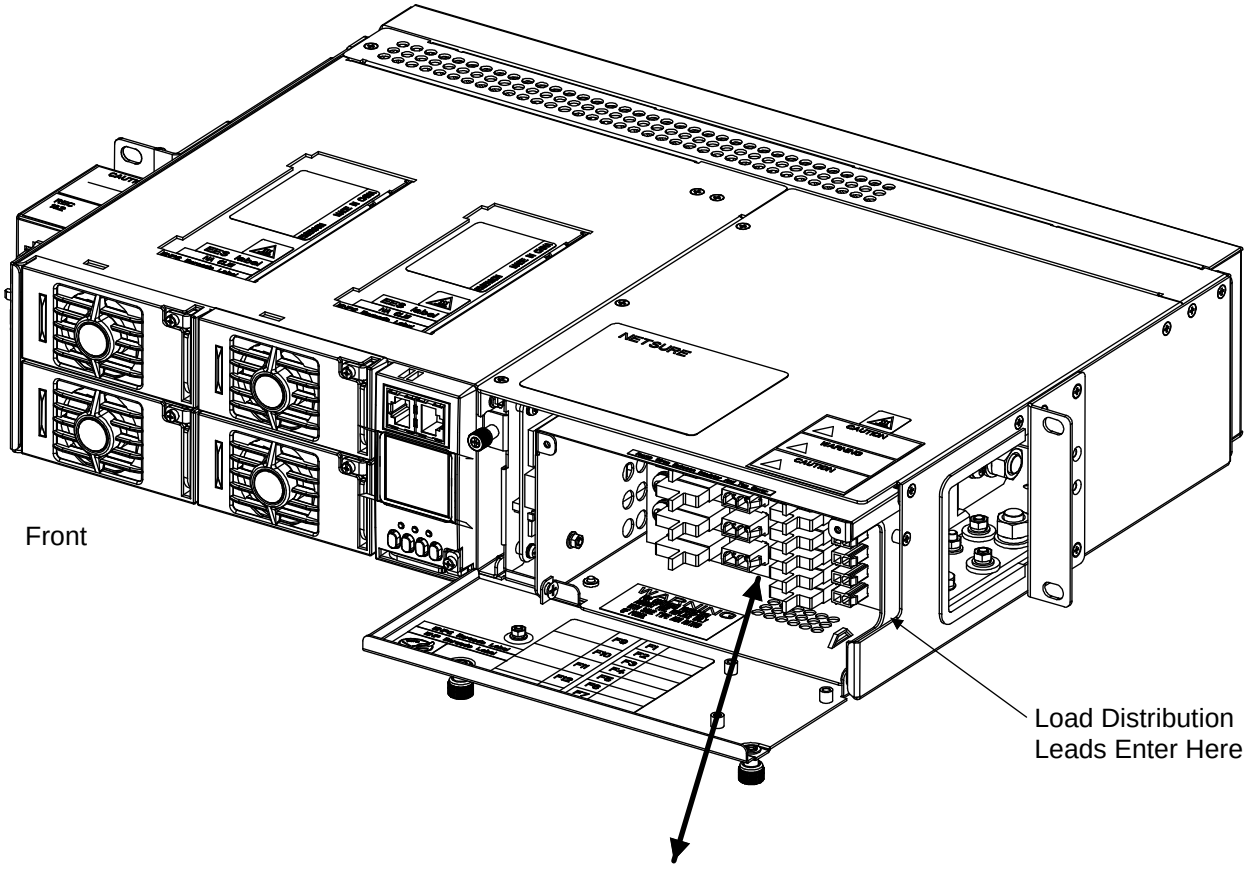
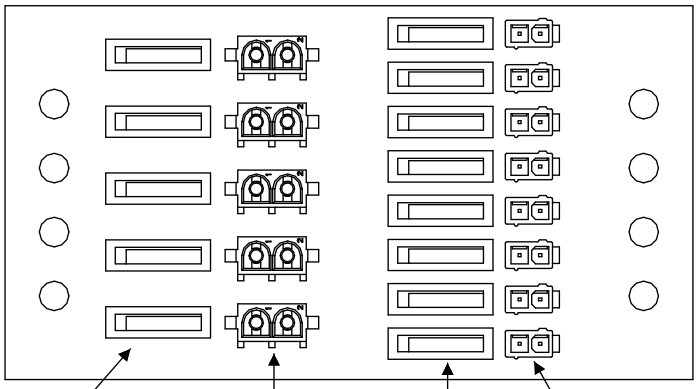
Load Distribution Wiring (GMT Fuses) (Lists BF, LF, and NF installed in a List 5 or 6, List 5 shown)





GMT Fuse Positions (Max. 15A)

GMT Fuse Load Distribution Leads Connect Here

Mating Connectors and 12' Leads provided with List 62.

-48V on Left (Black Lead), Return on Right (White Lead)

GMT Fuse Positions (Max. 10A)

GMT Fuse Load Distribution Leads Connect Here

Mating Connectors and 12' Leads provided with List 61.

-48V on Left (Black Lead), Return on Right (White Lead)

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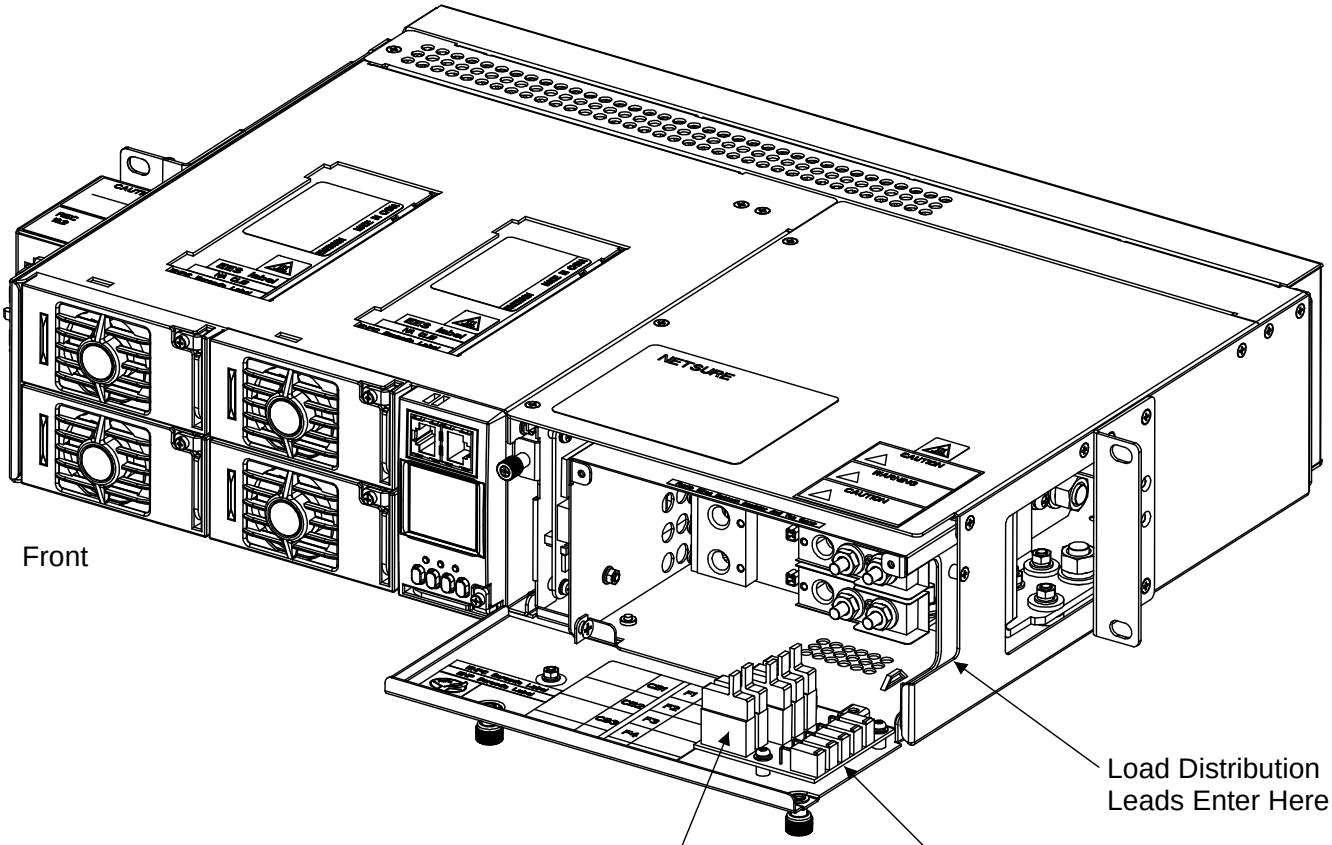
Load Distribution Wiring (GMT Fuses) (Lists BC, LC, NC, BA, LA, and NA installed in a List 5 or 6, List 5 shown)



Mating Connectors and 12' Leads provided with List 60.

-48V on Left (Black Lead), Return on Right (White Lead); as viewed from side with door closed.

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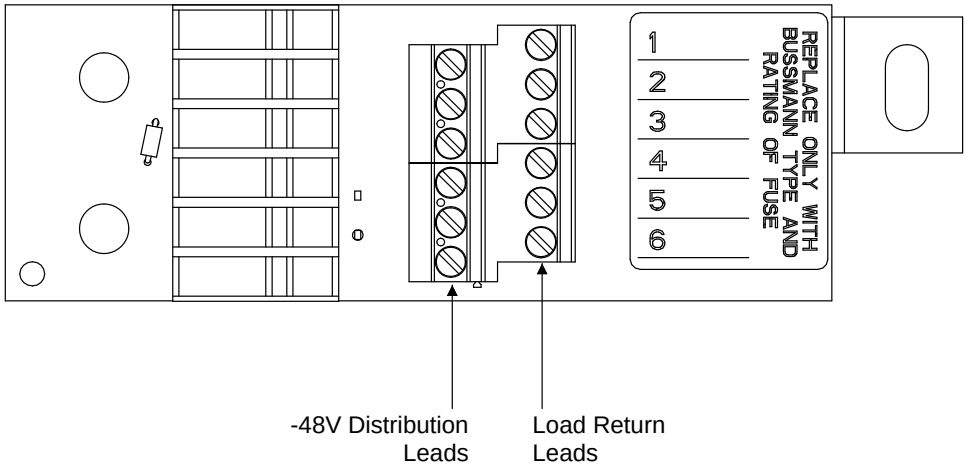
Load Distribution Wiring (Optional Bullet Nose 6-Position GMT Fuse Module)



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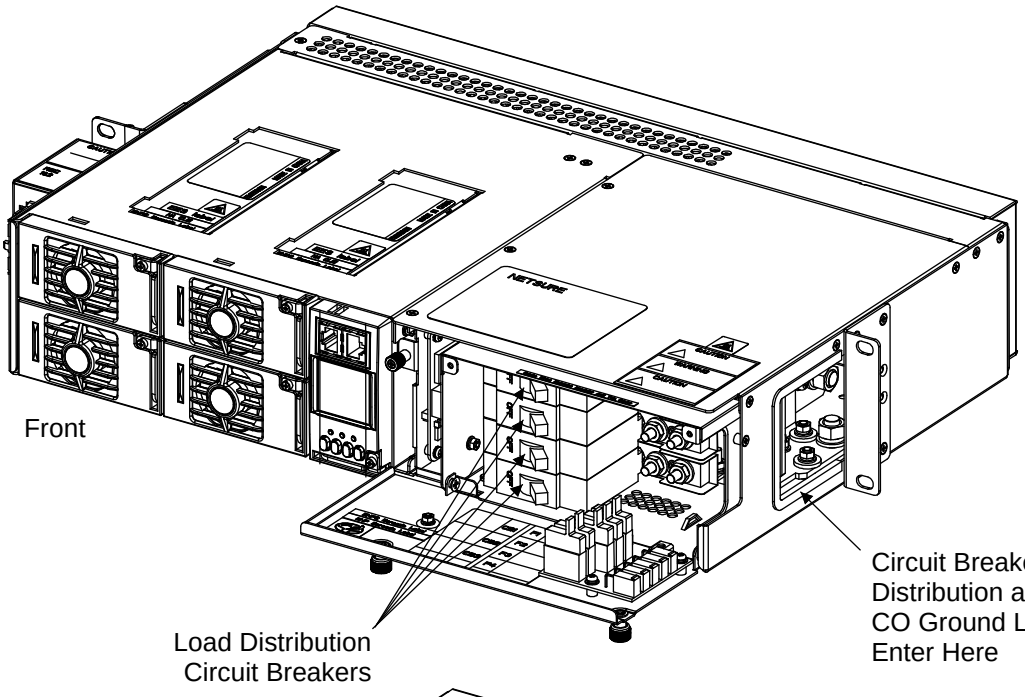
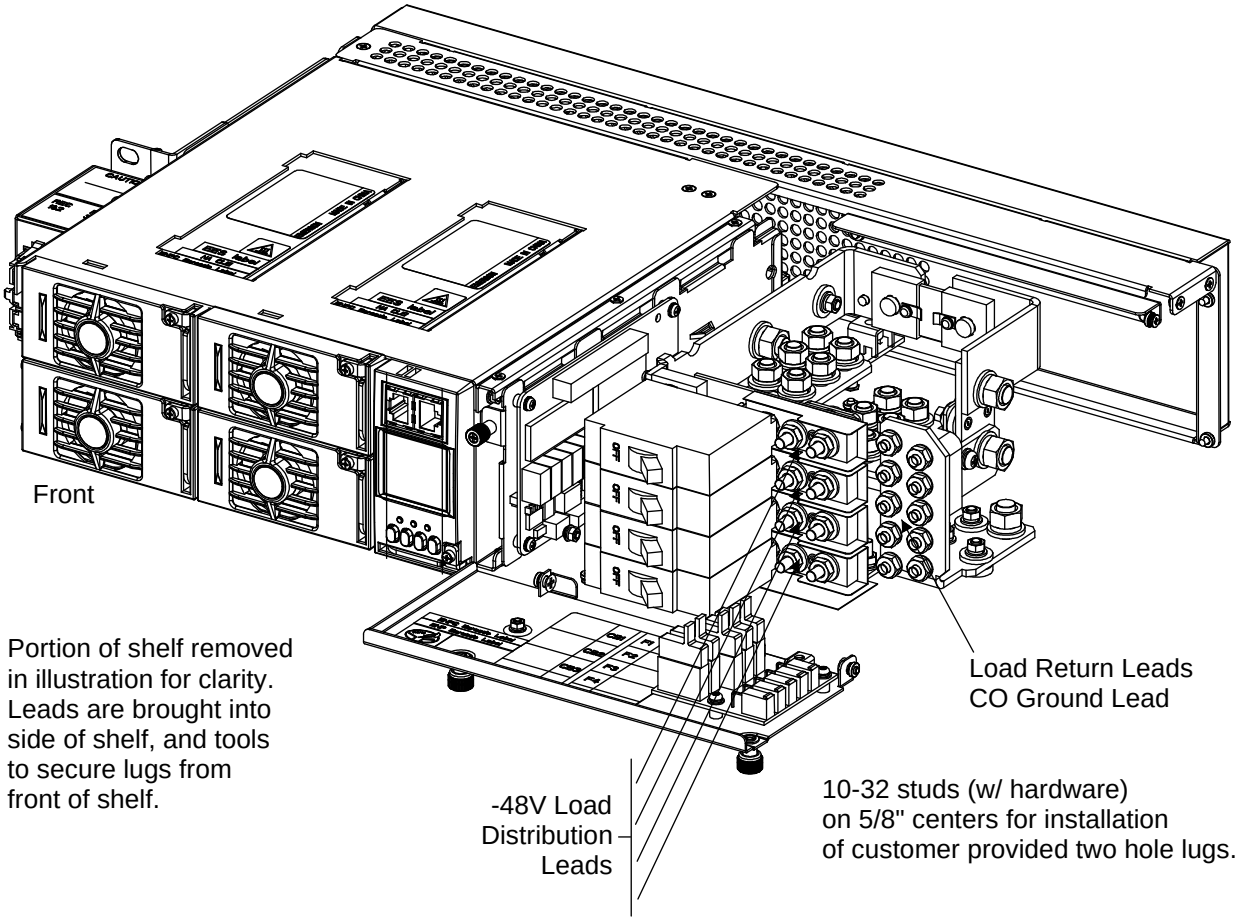
Load Distribution Wiring (Circuit Breakers) and CO Ground Wiring (Lists BC, LC, and NC installed in a List 5 or 6, List 5 shown)





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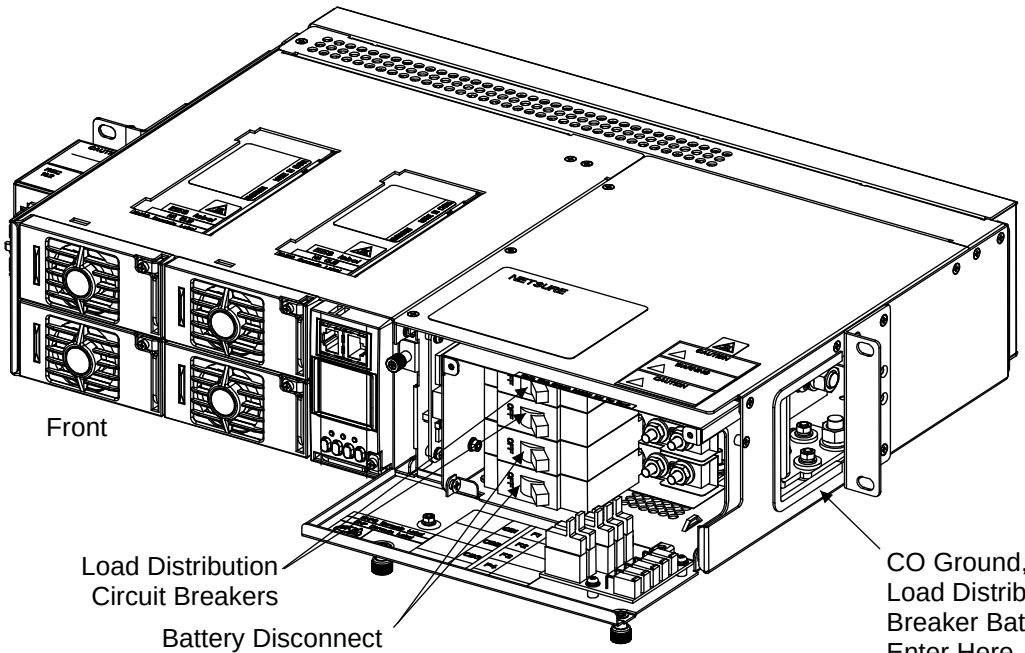
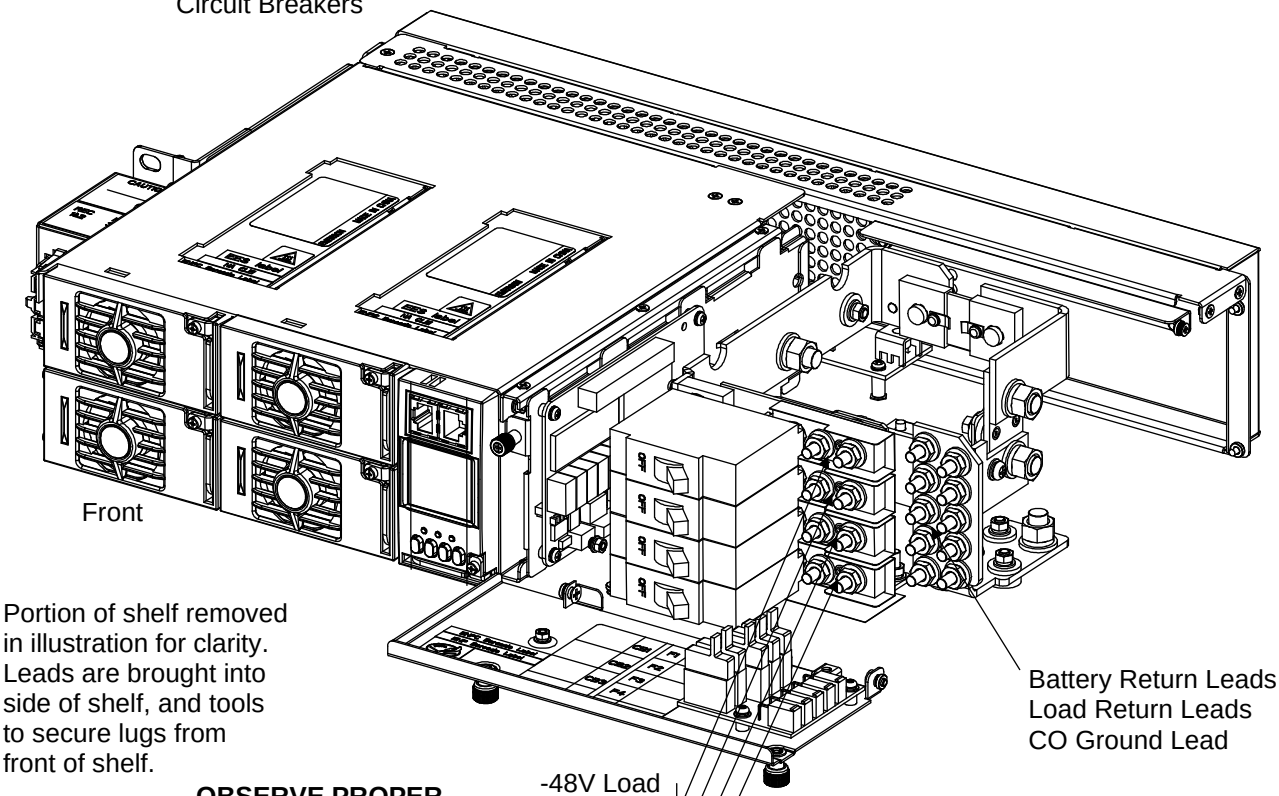
Load Distribution Wiring (Circuit Breakers), Input Battery Wiring (Circuit Breakers), and CO Ground Wiring (Lists BA, LA, and NA installed in a List 5 or 6, List 5 shown)


Front
Load Distribution Circuit Breakers
Battery Disconnect Circuit Breakers
CO Ground, Circuit Breaker Load Distribution, and Circuit Breaker Battery Leads Enter Here


Front
Portion of shelf removed in illustration for clarity. Leads are brought into side of shelf, and tools to secure lugs from front of shelf.
Battery Return Leads
Load Return Leads
CO Ground Lead
-48V Load Distribution Leads
-48V Battery Leads
10-32 studs (w/ hardware) on 5/8" centers for installation of customer provided two hole lugs.

OBSERVE PROPER POLARITY WHEN MAKING BATTERY CONNECTIONS

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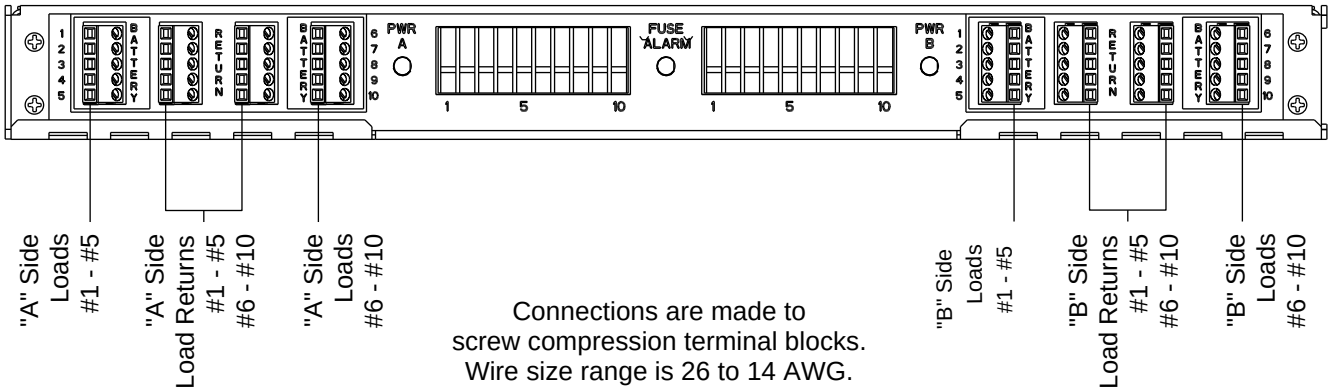
Load Distribution Wiring (GMT Fuses) (List KG)



Connections are made to screw compression terminal blocks. Wire size range is 26 to 14 AWG.

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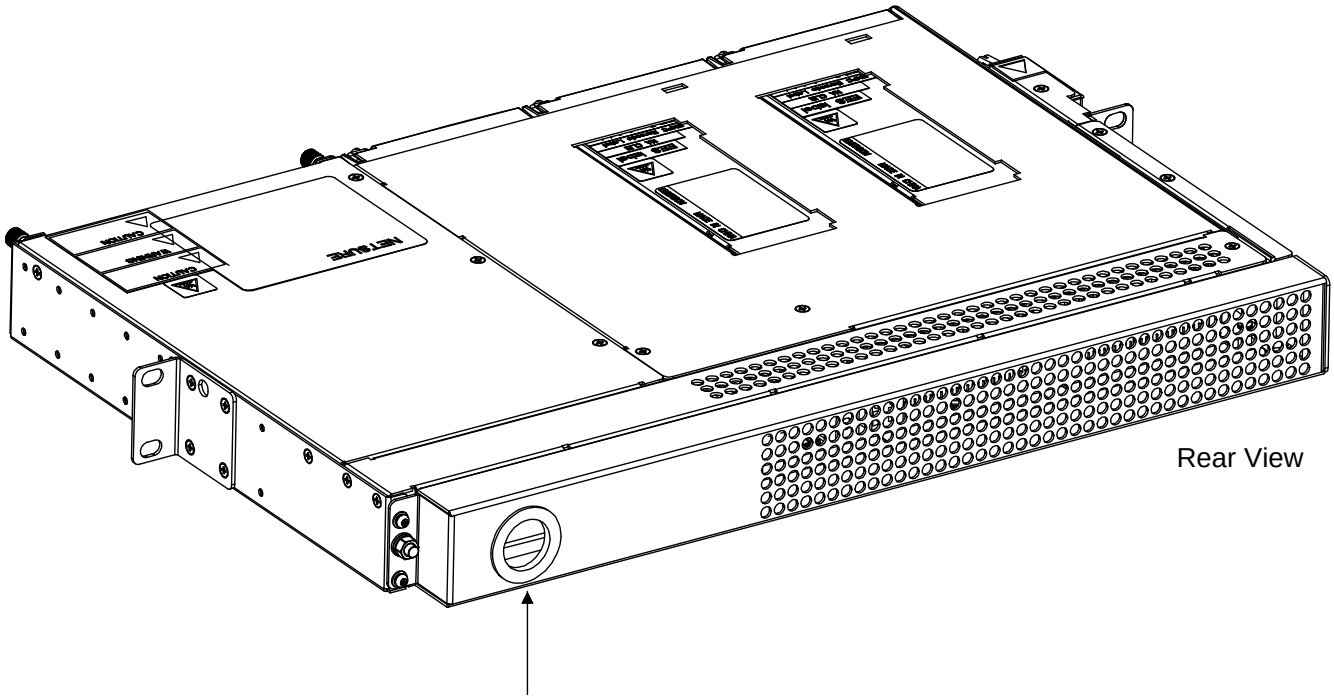
Input Battery Wiring (Lists BG and NG installed in a List 1 or 2, List 1 shown)



Connect battery leads to factory installed leads exiting the shelf here. These leads are factory terminated in an Anderson connector. A mating half to this connector is provided for connection to customer battery leads. External battery cables are also available to connect 1 (List 71) or 2 (List 72) strings of batteries to the system.

OBSERVE PROPER POLARITY. LEADS AND CONNECTORS ARE MARKED WITH A PLUS AND MINUS SYMBOL OR TEXT.

Minus (-48V Battery)
Plus (Battery Return)

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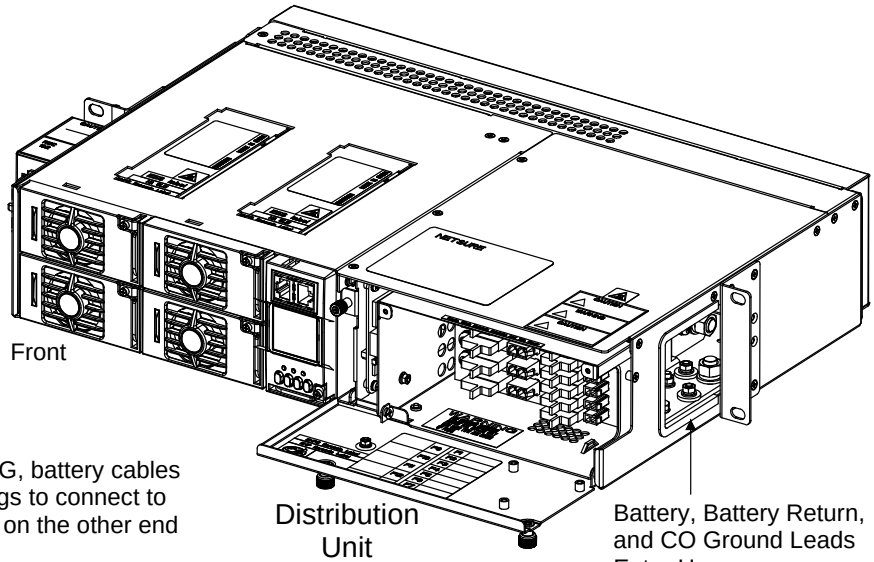
Input Battery Wiring (Lists BF, LF, NF, BC, LC, and NC installed in a List 1 or 5, List 5 shown) and CO Ground Wiring (Lists BF, LF, and NF installed in a List 1 or 5, List 5 shown)

List NF Distribution Unit shown. List BF, LF, BC, LC, and NC similar.

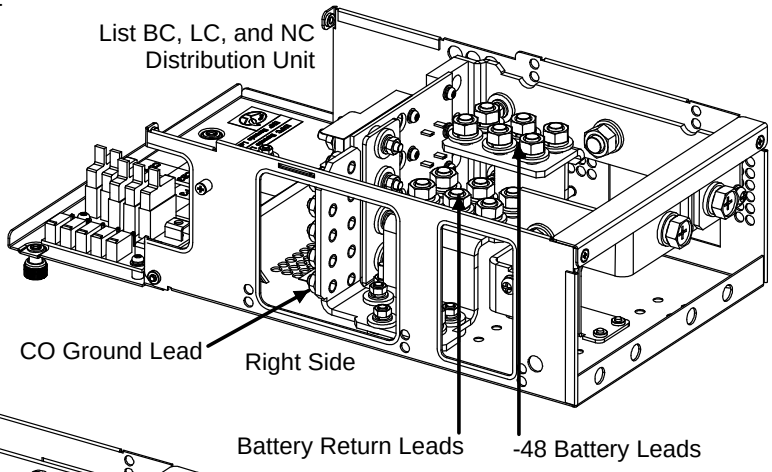


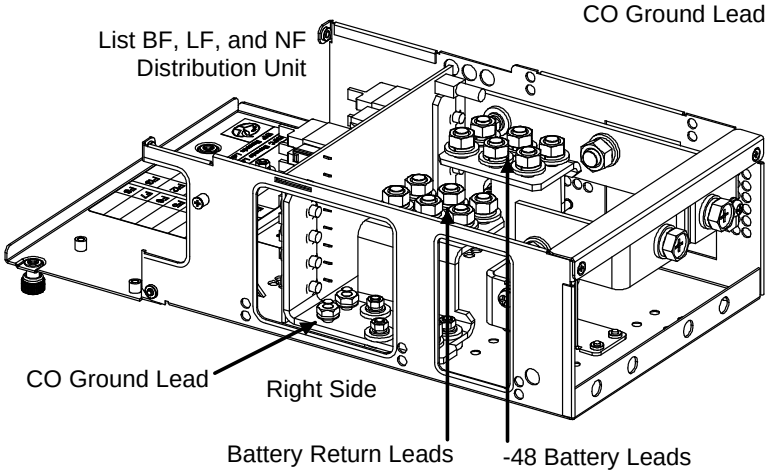
List 65 provides 3' long, 2 AWG, battery cables terminated on one end with lugs to connect to the input battery landings and on the other end with an Anderson connector.

List 66 provides 12' long, 2 AWG, battery cables terminated on one end in an Anderson connector and left unterminated at the remaining end for connection of battery lugs.

Battery: 1/4-20 studs (w/hardware) on 5/8" centers for installation of customer provided two hole lugs.

CO Ground: 10-32 studs (w/hardware) on 5/8" centers for installation of customer provided two hole lugs.





OBSERVE PROPER POLARITY WHEN MAKING BATTERY CONNECTIONS

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SPECIFICATIONS

Note: *For all rectifier specifications, refer to the separate Rectifier User Manual (UM1R48500/UM1R481000) supplied with your Power System.*

For all controller specifications, refer to the Controller User Manual (UM1M521B or UM1M820B) supplied with your Power System.

For factory settings of all configurable Controller parameters, refer to the Configuration Drawing (C-drawing) supplied with your Power System.

1. SYSTEM

1.1 Environmental Ratings

1.1.1 Operating Ambient Temperature Range (Specification Compliant):

(A) -40°C (-40°F) to +65°C (+149°F) with derating output.

(B) -40°C (-40°F) to +40°C (+104°F) with full power performance.

1.1.2 Storage Ambient Temperature Range: -40°C (-40°F) to +75°C (+167°F).

1.1.3 Humidity: This Power System is capable of operating in an ambient relative humidity range of 0% to 90%, non-condensing.

1.1.4 Altitude: 2000 m (6560 ft) at full power (power limited for heights above 2000 m).

1.1.5 Mounting: This product is intended only for installation in a Restricted Access Location on or above a non-combustible surface.

This product must be located in a Controlled Environment with access to Craftspersons only.

This product is intended for installation in Network Telecommunication Facilities (CO, vault, hut, or other environmentally controlled electronic equipment enclosure).

This product is intended to be connected to the common bonding network in a Network Telecommunication Facility (CO, vault, hut, or other environmentally controlled electronic equipment enclosure).

Typical industry standards recommend minimum aisle space clearance of 2'6" for the front of the relay rack and 2' for the rear of the relay rack.

Separate shelves are available for mounting in either a 19" or 23" wide relay rack (1” or 1-3/4” multiple drillings for the 2U shelf and 1-3/4" multiple drillings for the 1U shelf).

Mounting angles are positioned for a 5-inch front projection mounting only.

1.1.6 Ventilation Requirements: Rectifier and mounting shelf ventilating openings must not be blocked and temperature of air entering rectifiers must not exceed rated Operating Ambient Temperature Range stated above.

1.2 Compliance Information

1.2.1 Surge Protection: Refer to Paragraphs 2.3.6. and 3.3.6.

Note: *This level of protection is a widely used standard for telecommunications power equipment. As with all such equipment, it is the end user's responsibility to provide an adequately sized Surge Suppression Device at the commercial power service entrance of the building that reduces all incoming surges to levels below the classes/categories stated for the equipment.*

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1.2.2 Safety Compliance:

(A) This unit meets the requirements of UL 60950, Standard for Information Technology Equipment, and is UL Recognized as a power supply for use in Telephone, Electronic Data Processing, or Information Processing Equipment.

(B) This unit meets the requirements of CAN/CSA 22.2, No. 60950-00 and is tested and Certified by UL ("c UR") as a Component Type Power Supply.

1.2.3 EMC and Safety:

(A) Complies with the Low-Voltage Directive, 73/23/EEC. Complies with Emissions and Immunity requirements as specified in GR-1089-Core Issue 4.

EMC		
Emissions		**Test Level**
EN 55022: 1998 CFR 47 – Part 15 GR-1089 Issue 4	Conducted	Class B
	Radiated	Class B
Immunity		
GR-1089 Issue 4	EN 61000-4-2 Electrostatic Discharge	8kV / 15kV
	EN 61000-4-4 Electric Fast Transients	0.25kV / 0.5kV
	Radiated Immunity	8.5V/m
	Conducted Immunity	89dBuA
	Surge IEEE C62.41	2kV / 6kV
SAFETY		
EN 60950-1: 2001	Safety of Information Technology Equipment, including Electrical Business Equipment	

1.2.4 NEBS Compliance

NEBS Compliance: Compliance verified by a Nationally Recognized Testing Laboratory (NRTL) per GR-1089-CORE and GR-63-CORE. Contact Emerson Network Power for NEBS compliance reports.

For NETSURE™ 211NGFB to remain compliant during a fan failure condition, the backup battery connection must be utilized to provide sufficient power to the loads for up to eight (8) hours when the system is operated at greater than 50% output power. If no backup battery connection is used, the system must operate with a redundant module installed.

1.3 Standard Features

1.3.1 AC Input Connections:

AC input cable assemblies and line cords are available.

(A) List 1 and 2: Mounted to the side of the shelf is an AC input housing with one (1) plug-in connector for one (1) AC input feed.

(B) List 5 and 6: Mounted to the side of the shelf is an AC input housing with two (2) plug-in connectors for two (2) AC input feeds.

1.3.2 Battery Connections:

Battery cables are available.

(A) List 1 and 2: Battery leads are connected to an Anderson connector exiting the rear of the unit.

(B) Lists 5 and 6: Battery and battery return leads terminated in two-hole lugs are connected to threaded studs located inside the Distribution Unit. Battery leads are brought into the right side (as viewed from the front) of the shelf.

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1.3.3 Load Connections:

(A) List 1 and 2: Load and load return leads are connected to a screw-type terminal block located on the front of the shelf.

(B) Lists 5 and 6: Load distribution (circuit breakers, if furnished) and load return leads terminated in two-hole lugs are connected to threaded studs located inside the Distribution Unit. Load leads are brought into the right side (as viewed from the front) of the shelf and are accessible from the front of the shelf.

Load distribution (GMT fuses) and load return leads are connected to receptacles located inside the Distribution Unit. Load leads are brought into the right side (as viewed from the front) of the shelf and are accessible from the front of the shelf.

1.3.4 Alarm and Monitoring Connections: Customer wiring cables are available.

(A) List 1 and 2: Relay output and digital input leads are connected to screw-type terminal blocks located on the SCU+ located inside the shelf. These leads enter the rear of the shelf.

(B) Lists 5 and 6: Relay output and digital input leads are connected to screw-type terminal blocks located on the Customer Interface Board located inside the shelf. These leads enter the right side (as viewed from the front) of the shelf and are accessible from the front of the shelf.

1.3.5 Dimensions and Weights: Refer to the PHYSICAL SIZE INFORMATION section of this document.

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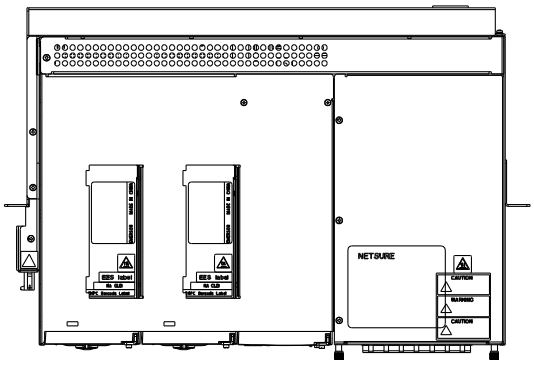
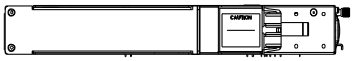
PHYSICAL SIZE INFORMATION

Overall Dimensions – List 1

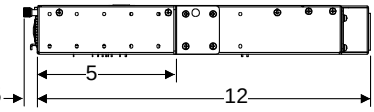


Top View

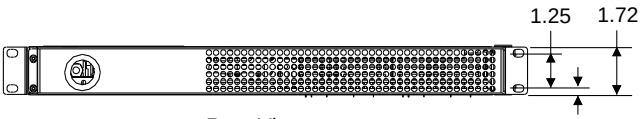


Left Side View

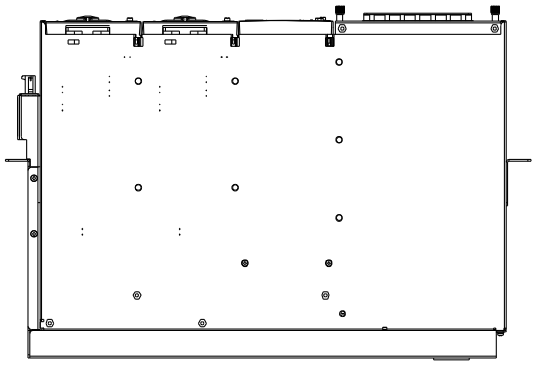
Front View



Right Side View



Rear View



Bottom View

Notes:

1. All dimensions are in inches, unless otherwise specified.
2. Weight in LBS.
   Net: 16
   Shipping:
3. Finish: Front Panels are Gray
   Shelf is Galvaneal.

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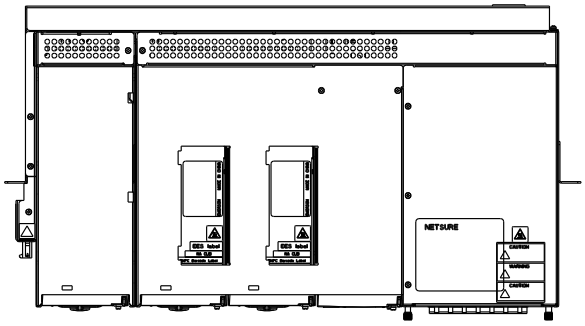
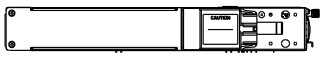
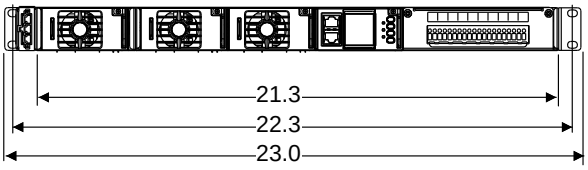
Overall Dimensions – List 2



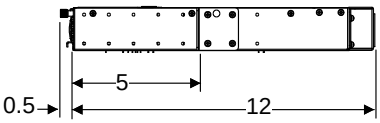
Top View



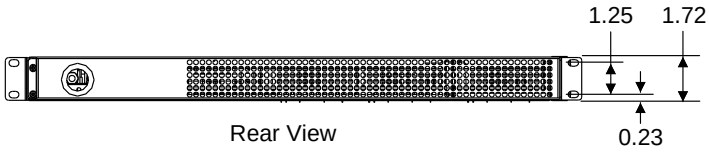
Left Side View



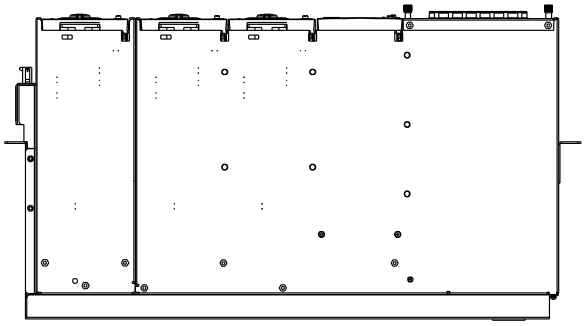
Front View



Right Side View



Rear View



Bottom View

Notes:

1. All dimensions are in inches, unless otherwise specified.
2. Weight in LBS.
   Net: 20.5
   Shipping:
3. Finish: Front Panels are Gray
   Shelf is Galvaneal.

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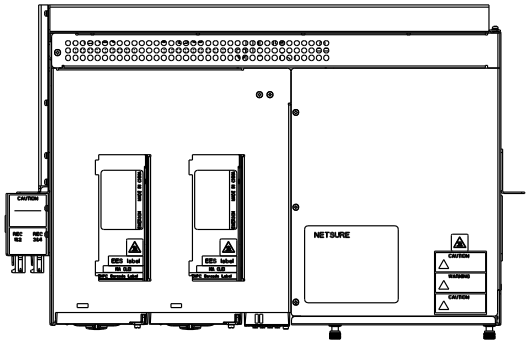
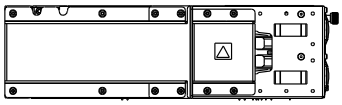
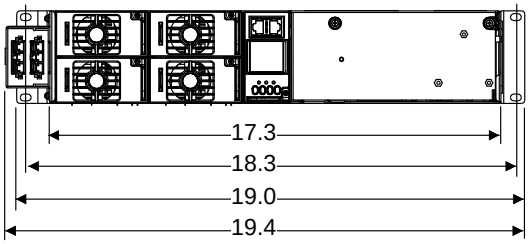
Overall Dimensions – List 5



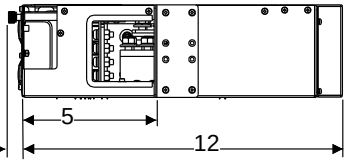
Top View



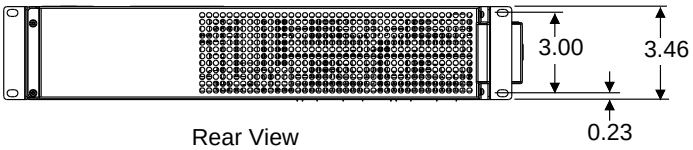
Left Side View



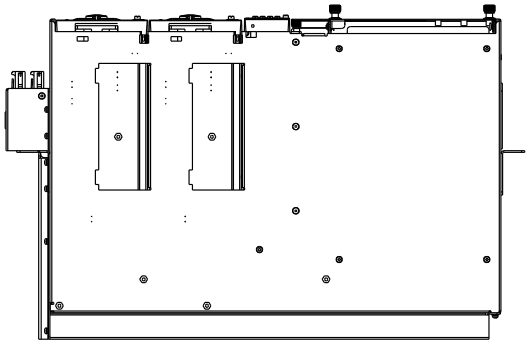
Front View



Right Side View



Rear View



Bottom View

Notes:

1. All dimensions are in inches, unless otherwise specified.
2. Weight in LBS.
   Net: 30
   Shipping:
3. Finish: Front Panels are Gray
   Shelf is Galvaneal.

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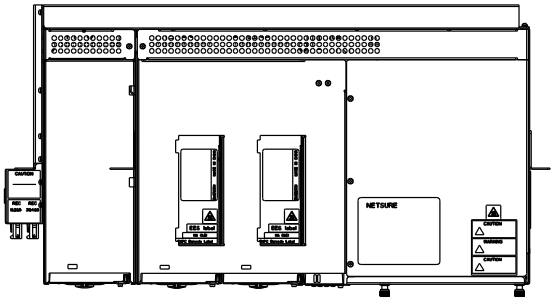
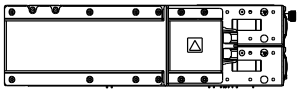
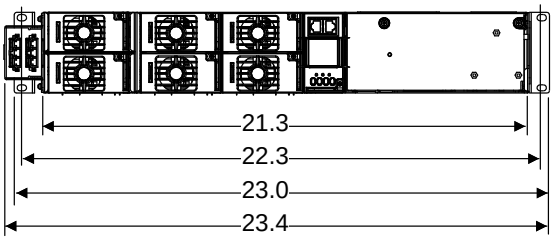
Overall Dimensions – List 6



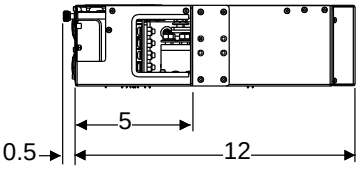
Top View



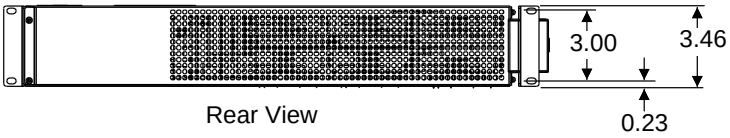
Left Side View



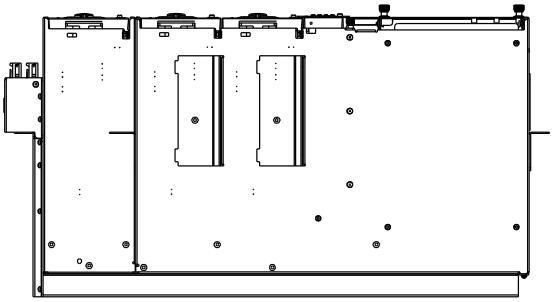
Front View



Right Side View



Rear View



Bottom View

Notes:

1. All dimensions are in inches, unless otherwise specified.
2. Weight in LBS.
   Net: 39
   Shipping:
3. Finish: Front Panels are Gray
   Shelf is Galvaneal.

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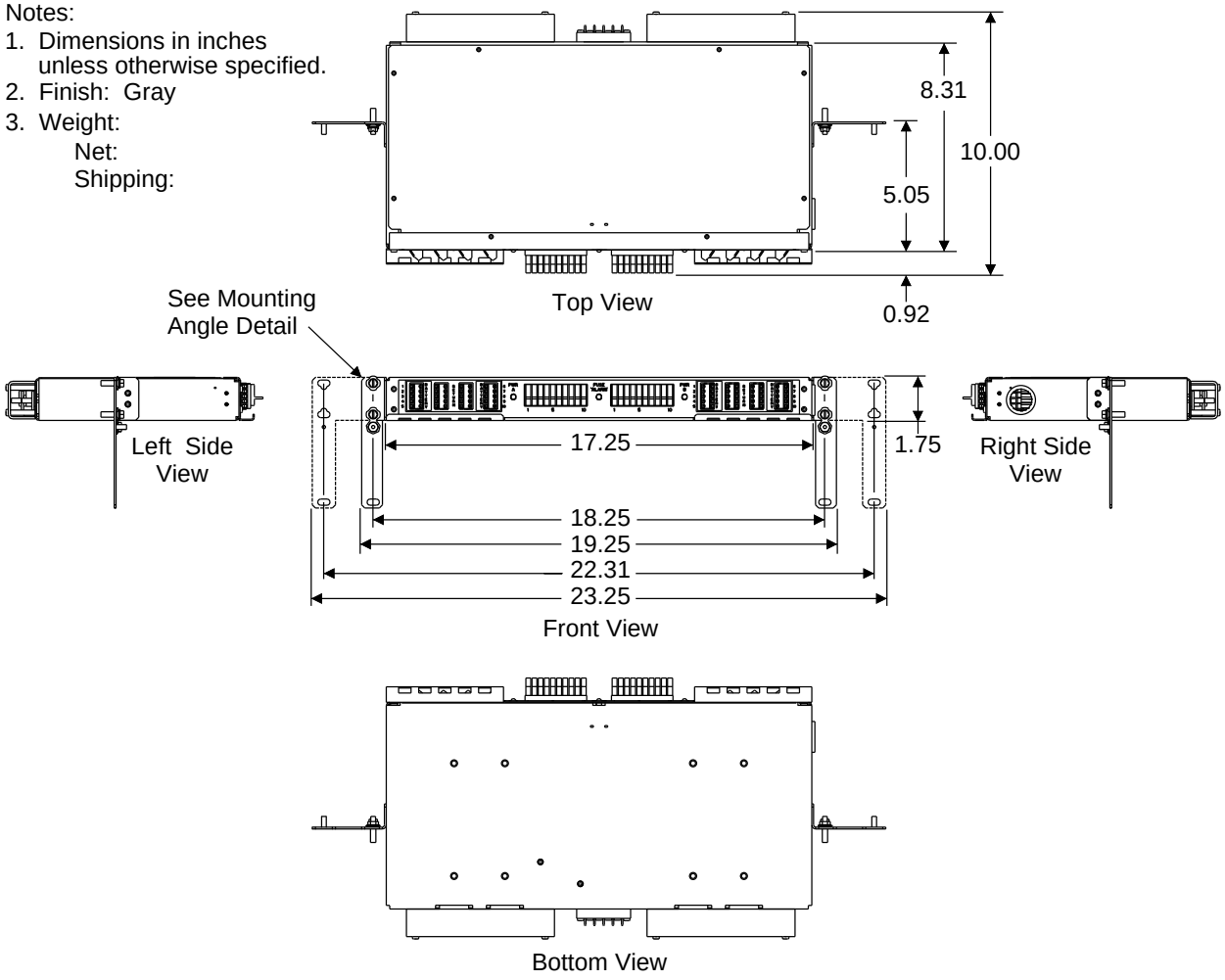
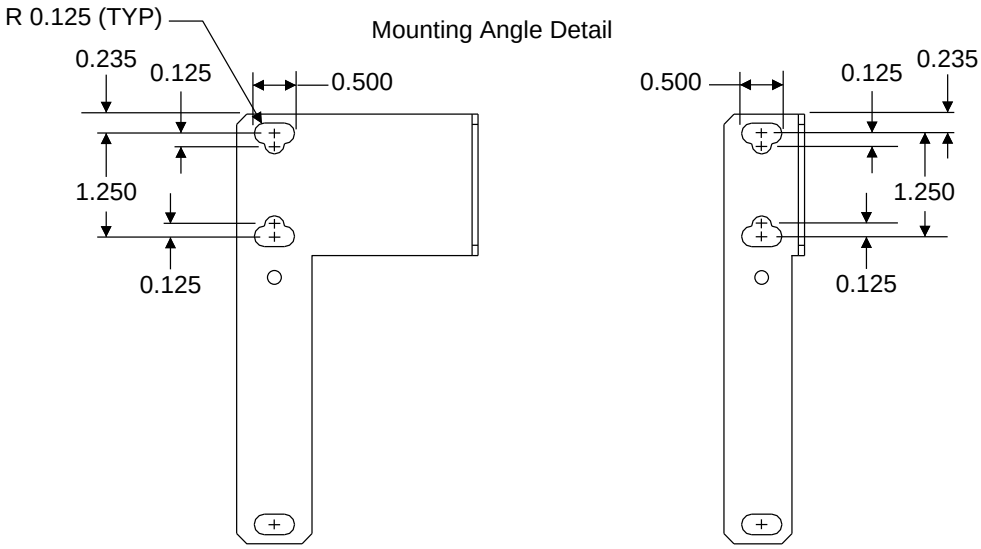
Overall Dimensions – List KG

Notes:
1. Dimensions in inches unless otherwise specified.
2. Finish: Gray
3. Weight:
   Net:
   Shipping:





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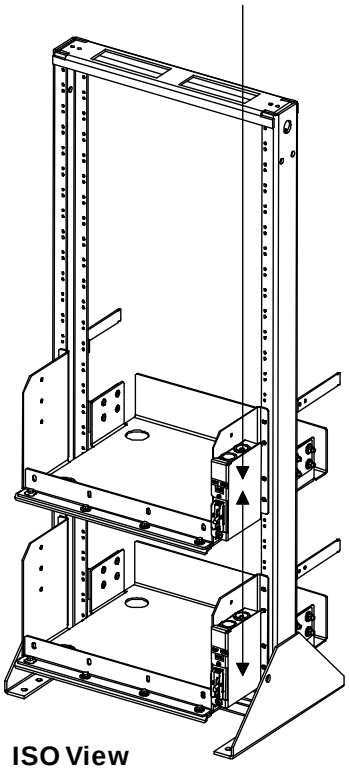
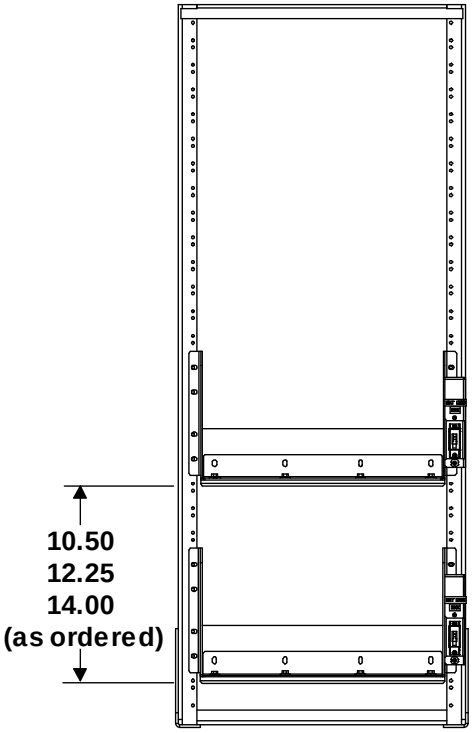
Overall Dimensions – 19" Battery Tray

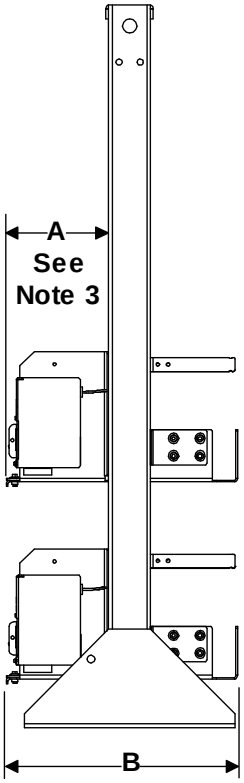
Optional Battery Disconnect Circuit Breakers
(Shown on Right Side, Available on Either Side)



ISO View



Front View



Right Side View

Notes:

1. All dimensions are in inches, unless otherwise specified.
2. P/N 541036 tray shown. P/Ns 541034 and 540841 similar.
3.

Tray P/N	Dimension A	Dimension B
541036	7.03	16.47
541034	7.03	20.95
540841	6.90	12.50

4. Weight in LBS. (per tray, less batteries).

Part No.	With Circuit Breaker Option	Without Circuit Breaker Option
541036	20.5 lbs	18.5 lbs
541034	25.3 lbs	23.3 lbs
540841	18.5 lbs	16.5 lbs

5. Finish: Gray
6. Maximum trays available per rack is three (3).

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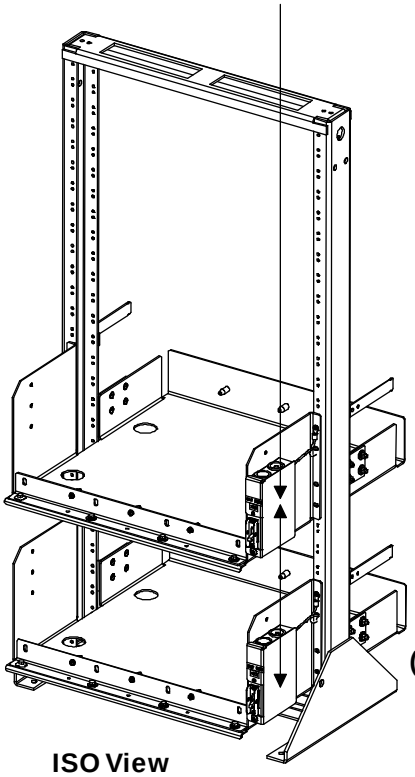
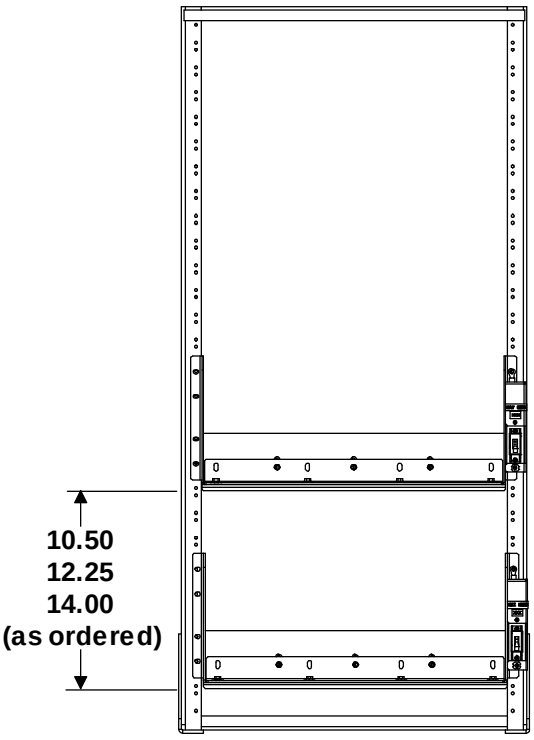
Overall Dimensions – 23" Battery Tray

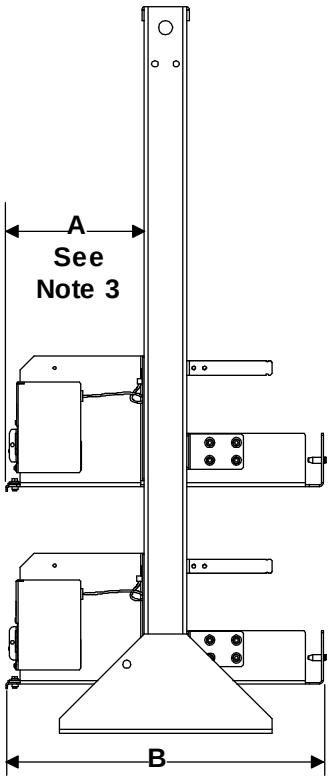
Optional Battery Disconnect Circuit Breakers (Shown on Right Side, Available on Either Side)



ISO View



Front View



Right Side View

Notes:

1. All dimensions are in inches, unless otherwise specified.
2. P/N 528496 tray shown. P/N 540842 similar.
3.

Tray P/N	Dimension A	Dimension B
528496	9.781	24.437
540842	6.90	12.50

4. Weight in LBS. (per tray, less batteries).

Part No.	With Circuit Breaker Option	Without Circuit Breaker Option
528496	33 lbs	29 lbs
540842	20 lbs	18 lbs

5. Finish: Gray
6. Maximum trays available per rack is three (3).

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BATTERY MANUFACTURER INFORMATION

Some equipment described in this System Application Guide is designed to accommodate batteries from various manufacturers. The following are referenced in this document.

C&D: C&D Technologies, Inc., Powercom Div., 1400 Union Meeting Road, Blue Bell, PA 19422-0858

Deka®: East Penn Mfg. Co., Inc., Lyon Station, PA 19536-0147

Douglas®: Douglas Battery Mfg. Co., 500 Battery Dr., Winston-Salem, NC 27117-2159

Marathon™: GNB Industrial Power, a Division of Exide Technologies, Princeton, NJ 08543.

Northstar: NorthStar Battery Co. LLC, 4000 Continental Way, Springfield, MO 65803

RELATED DOCUMENTATION

Installation Instructions:	Section 6031
User Instructions:	Section 6032
Battery Cabinet Spec. No. 541434 Installation and User Instructions:	Section 6023
Battery Cabinet Spec. No. 545534 Installation and User Instructions:	Section 6033
Battery Cabinet Spec. No. 545506 Installation and User Instructions:	Section 6036
Rectifier User Instructions:	UM1R481000
SCU+ Controller User Instructions:	UM1M521B
ACU+ Controller User Instructions:	UM1M820B

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REVISION RECORD

Issue	Change Number (ECO)	Description of Change	Date	Approved
AA	LLP212765	New	09/16/2009	John Jasko
AB	LLP213064	List BC, LC, and NC RESTRICTIONS updated. Reference to custom SCU+ configurations added. Custom digital input cable kit added.	10/09/2009	John Jasko
AC	LLP213144	Lists BF, LF, and NF now available (note stating Lists were unavailable removed from document). Restriction added to Battery Cabinet P/N 541434 that it can only be used with List 1 and 2.	01/06/2010	John Jasko
AD	LLP213376	Added 545644, 58213660067, 545728, 540993, 545616, 547525, 548457, 541285, 545534, and 545506. Updated breaker alarm wiring and system ratings and wiring information. Changed input cord gauges per LLP213702 Add P/N 547645	05/19/2010	Shanon Ravacio
AE	LLP214159	Add AP6C57EA/EB Ring and Distribution Module	09/03/2010	Shanon Ravacio
AF	LLP214106	List LA now available (notes stating List was unavailable removed from document). Added List KG, List 91, ACU+, and SiteWeb™ TEMP. Removed Rectifier and Controller specification information, and referenced the separate Rectifier and Controller User Manuals.	12/14/2010	John Kirkpatrick
AG	LLP214167	List KG now available with all distribution list options. AP6C57EA/EB Ring & Distribution Module available with List 2 and List 6. Added Part Nos. 548196 and 547674. Updated SM module branding. Removed redundant distribution unit information from Specification section.	4/20/2011	John Kirkpatrick Donald Rake Apr 21, 2011 John Kirkpatrick Apr 20, 2011

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